NETWORK WORLD
THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING
AN INTERNATIONAL DATA GROUP PUBLICATION ◆ VOLUME 11, NUMBER 38 ◆ SEPTEMBER 19, 1994

IBM hopes to strike gold with Karat mgmt. system

Object-oriented manager built on NetView/6000.

BY MICHAEL COONEY

Atlanta

IBM last week detailed plans for a new object-oriented enterprise management platform, code-named Karat, intended to bring management systems and applications from IBM and other vendors together under one roof.

"Karat will usher in a new era of integration," explained Bill Warner, vice president of IBM's enterprise management systems. "From a single platform, users can manage any device or system in their enterprise."

The product will include NetView/6000 technology but will not be limited to running on the RISC System/6000 platform. It will also contain IBM's System Object Model (SOM) and Distributed SOM (DSOM) code, as well as some other Common Object Request Broker Architecture (CORBA)-compliant technology.

SOM is an object-oriented development environment that lets users create object-class libraries and programs. DSOM is the object request broker for SOM that lets users or vendors develop distributed object-oriented applications that work on multiple platforms.

IBM has previously discussed the idea of integrating SOM and

See **Karat mgmt.**, *page 100*

IBM *talks teamwork*

Looks to CNT/Brixton to add Unix-to-SNA connectivity. **Page 6.**

Unveils Token Ring-to-ATM switch developed with Kalpana. **Page 8.**

Telco partners targeting end-to-end frame relay nets

BY DAVID ROHDE

Atlanta

The Big Three long-distance carriers are partnering with their local counterparts to offer end-to-end frame relay services that could take a big bite out of users' network bills.

These one-stop shopping services would enable customers to order frame relay access links along with long-haul service from their long-distance carrier, just as they can today with private lines.

Substituting frame relay for dedicated access lines in the local loop could save users with at least three sites in the same vicinity some 20% to 30% on local charges, said Brad Hokamp, Sprint Corp.'s group manager of frame relay services.

It will also extend the benefits of frame relay — such as efficient bandwidth utilization, especially for bursty data — further out into the network while giving users a unified bill.

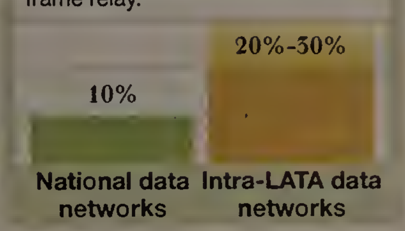
Sprint is working on the exact pricing for the local side of its combined frame relay service and hopes to introduce it in the first half of 1995, Hokamp said.

AT&T will likely begin offering it in the sec-

See Frame relay, *page 8*

The big payoff

Estimated savings with end-to-end frame relay.



SynOptics, Wellfleet plot to hold their competitors at Bay

BY JIM DUFFY AND SKIP MACASKILL

Atlanta

SynOptics Communications, Inc. and Wellfleet Communications, Inc. this week will announce a new name — Bay Networks, Inc. — to go with the new product strategy the merger-minded pair discussed at last week's NetWorld+Interop trade show.

The moniker plays off SynOptics' proximity to San Francisco Bay and Wellfleet's roots in Massachusetts, the Bay State. While choosing a name is a first step in integrating operations, the companies face the daunting job of melding their product lines if shareholders approve the merger next month.

Just how they will do that is not entirely clear. The product strategy outlined at a press conference here was long on concept and short on specifics; the firms did little more than offer their rationale for the merger once again and

See Bay, *page 100*

The to-do list

Now that government approval has been granted, completion of the SynOptics/Wellfleet merger into Bay Networks consists of:

This week	**Mailing proxy statement to respective shareholders**
Early Oct.	**Road show to drum up support for merger**
Oct. 20	**Shareholder approval voting**

MICROSOFT & STANDARDS

Users say, 'Listen up'

Second in a three-part series.

BY BARB COLE AND KEVIN FOGARTY

Redmond, Wash.

Microsoft Corp. wields power unmatched in the computer industry since IBM bestrode the world like a colossus. And as was once the case with Big Blue, users don't think the new colossus listens very well.

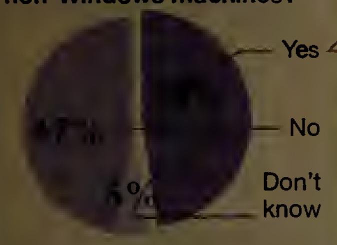
Besides craving more input into Microsoft standards development efforts, users want faster implementation of Microsoft standards across multiple platforms. And they need Microsoft standards to work with competing application program interfaces (API).

Users are troubled by the desktop software giant's control of de facto software standards, such as the Object Linking and Embedding (OLE) and Open Database Connectivity (ODBC) specifications on which its products

See Microsoft, *page 98*

Measuring Microsoft's openness

Do you foresee having to implement one set of networking, object or database access specifications for Windows and another for non-Windows machines?



If yes, how big a problem will that be?	
A big problem	41%
A problem	6%
Not a big problem	32%
Not sure	21%

Based on a survey of 200 users.

SOURCE: FOCUS DATA, INC., FRAMINGHAM, MASS.

Workflow, imaging help bank cash in

BY KEVIN FOGARTY

Hong Kong

Faced with costs rising faster than revenue, Bank of America National Trust and Savings Association turned to imaging and workflow technology to reengineer its Asian operations.

The $3.5 million imaging and workflow system has paid for itself in 14 months, slashing processing and personnel costs by 53% and 22%, respectively. Although deployment of the system is not yet complete, the bank has seen enough benefits, including a 40% increase in productivity, to expand its rollout plans to other divisions abroad.

The bank's Asia Wholesale Banking Division, an $11 billion operation running in 12 countries, had become hobbled by the burden of moving paper records via courier among its multinational Asian branches, said Doug Switzer, the bank's vice president of wholesale operations and overseer of the project.

Today, letters of credit and other documentation vital to international business are made available instantaneously over the company's existing network via the new client/server-based imaging and workflow system.

The development team was

See Bank, *page 99*

Special Issue

NetWare

Novell is retooling NetWare with a host of enterprise services to make it the Swiss army knife of network operating systems. But to succeed, the vendor has to deal with a slew of issues on the E-mail, ATM and multiprocessing fronts.

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NEWSPAPER
100

Briefs

Chicago chaos. Network gremlins struck Chicago last week as the Chicago Board of Trade, O'Hare International Airport and MCI Communications Corp. all suffered outages. At 8:45 a.m. on Wednesday, a power outage shut down radar systems at O'Hare; then at 9:37 a.m., computers at the Board of Trade went on the fritz due to unknown causes. Finally, MCI customers lost service for about two hours due to switch problems. The three outages were unrelated.

Wire-less prices. On Jan. 1, ARDIS Co. plans to cut the charges for its wireless messaging service by 25%. The cost per message unit will fall from 8 to 6 cents, and the per-character charge will drop from .04 to .03 cents. Off-peak and monthly minimums will also be reduced. The cuts take advantage of the carrier's upgrade from transmission at 4.8K to 19.2K bits/sec in selected areas.

Getting its CIX. At last week's meeting in Atlanta of the Commercial Internet Exchange (CIX), members voted to shelve the controversial plan to block the TCP/IP traffic of nonmembers, a decision made last July by the five-member CIX board. CIX, an organization of about 70 members, operates a routing hub that serves as the central exchange point for commercial traffic on the Internet.

Crime bill pays. With funding from the Clinton's crime bill, the Justice Department's Immigration and Naturalization Service (INS) last week moved ahead with plans to connect more than 300 offices here and abroad through a LAN internet. The agency intends to set up a large number of databases that INS employees will access over the LAN internet to assist them in immigration duties ranging from border inspection to green card work permits.

Hi MOMA. The Message-Oriented Middleware Association (MOMA) formally launched itself at last week's NetWorld+Interop show. Goals include promoting the asynchronous technology and looking at ways to ensure interoperability between various vendors' offerings. Among those attending the launch were representatives from the Open Software Foundation, Inc., which backs remote procedure calls (RPC) for linking clients with servers.

MOMA members were conciliatory toward RPCs, saying there is a place for both MOM and RPCs on large nets.

Welcome back to town, senator. Senate Commerce Committee Chairman Ernest Hollings (D-S.C.) will face a barrage of criticism as the Senate reconvenes today with the Communications Act of 1994 on its agenda. A bevy of groups will hold a joint press conference today to state that they supported Hollings' original proposal.

But according to a statement released late last week, they "have become deeply concerned about the radical changes to the bill" that were made in the rush to passage in Hollings' committee.

The groups include the International Communications Association, as well as consumer advocates, equipment manufacturers and state regulators. The changes include mandatory broadband network buildouts with favored rates for nonprofit groups, potentially raising costs for business users (*NW*, Aug. 29, page 1).

Bear, Stearns bullish on ATM. Bear, Stearns & Company, Inc. last week announced that it has chosen General DataComm, Inc.'s Apex family of ATM switches for its backbone production network.

Bear, Stearns did not reveal how many switches it will purchase, but said the deployment will first connect its data center with investment trading floors in Manhattan.

The network will eventually connect several hundred traders internationally.

Contacts

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Lotus offers an inexpensive Notes client and enhancements to its high-end messaging switch. *Page 5.*

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ENTERPRISE INTERNETWORKS

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LOCAL NETWORKS

Start-up sets a new pricing benchmark in the escalating Ethernet switching wars. *Page 27.*

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Windows Connectivity Forum, which makes its debut this week, is a column focusing on the challenges of networking Windows machines. *Page 32.*

WUGNET
Windows User Group Network

GLOBAL SERVICES

MCI introduces a Windows-based software package that integrates access to the carrier's on-line services. *Page 37.*

Ameritech launches its commercial ATM service with an inordinate number of service configurations. *Page 37.*

CLIENT/SERVER APPLICATIONS

Front-end tool crunch has vendors rushing to evolve products. *Page 45.*

Progress readies a new version of its database and front-end tools that have improved cross-platform support and other features. *Page 45.*

OPINIONS

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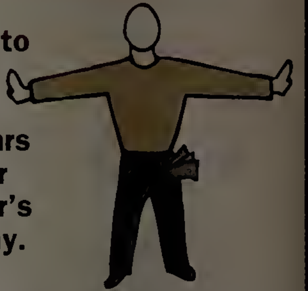
BUYER'S GUIDE

Users are advised to fend off the ATM switch vendors tugging at their ears and pulling at their wallets. The Buyer's Guide explains why. ***Page 69.***



Network HELP desk

Network World *tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Dana Thorat at (800) 622-1108, via fax at (508) 820-1103 or (508) 820-3467, via the Internet at djt@world.std.com or via CompuServe at 73244,2673.*

I am interested in integrating my voice mail with either an Artisoft, Inc. LANtastic 6.0 or a Novell, Inc. NetWare 3.12 network. Do you know of a voice mail system that will interface with my PBX and work reliably with LAN file servers to store voice mail messages? Or do voice mail systems require a dedicated machine and a local disk to work properly?

Ed Melsenbach, Melbourne, Fla.

Bill Walter, a manager at Pulse Technologies, Inc., a telecommunications consulting, training and software engineering company based in Chantilly, Va., replies:

I am not aware of any voice mail products that will operate on a shared LAN server. However, two software-based products that will operate on a dedicated server are SpeechSoft, Inc.'s SpeechMaster and Info Systems' Talkie. Both products will interface with your PBX through analog ports. SpeechMaster will accept Novell's Btreive format files while Talkie supports NETBIOS and NetWare.

These products must be paired with compatible digital signal processor boards (for example, Dialogic Corp.'s line of voice cards or Pika Technologies, Inc.'s AVA-B Series voice cards) and customized to meet your needs. Both SpeechMaster and Talkie have fax storage, audiotex and autoattendant capabilities. A major drawback of these products is the time required for customization.

Prices for SpeechMaster range from $595 for a two-port configuration to $2,395 for 32 ports. Starter kits, which include Dialogic boards, are also available. Pricing for Talkie starts at $715 for four ports. For more information about SpeechMaster, call (609) 466-1100. For more information about Talkie, call (716) 855-2244.

Another option to consider is stand-alone voice mail systems. Leaders in the stand-alone voice mail market include Active Voice Corp., Centigram Communications Corp. and Octel Communications Corp. These systems will typically cost more than the software-based products, however, less time and

See **Help desk,** *page 80*

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A $50 million budget. the scenes.

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Frankenberg on the right track, say Novell users

New CEO focuses on firm's core net services.

BY ADAM GAFFIN

Atlanta

New Novell, Inc. Chief Executive Officer Robert Frankenberg and his back-to-networking-basics message got some early good reviews from users at last week's NetWorld+Interop show.

At the show, where Novell's floor presence was by far the largest of any vendor, Frankenberg and other Novell officials portrayed their company as one committed to enterprise networking across heterogeneous platforms and applications.

"[Frankenberg showed that] there is a real clear focus on networking," said John Bjelland, vice president of information technology and application architecture management at Cargill, Inc., a Minneapolis agricultural commodities company.

Bjelland and other users said that in recent years under former Chairman Ray Noorda, Novell seemed to drift away from its net focus and was often unable to explain where it was headed.

"For a while, they were sort of doing everything," said Frank Goodyear, incoming president of NetWare Users International in North America and a consultant on WAN issues in Provo, Utah. At the same time, users were looking to Novell for help in moving from isolated LANs to enterprise nets, he said.

The new Novell will focus on linking NetWare and UnixWare through a single microkernel and integrating its newly acquired WordPerfect offerings with NetWare's network services. The company also discussed plans with AT&T to create a public NetWare network and to release client software code-named Ferrett to give end users access to such network services.

In addition, Frankenberg outlined with Microsoft Corp. a tactical truce, in which Novell will essentially cede the desktop operating system market to Microsoft.

Novell's planned UnixWare and NetWare combo, dubbed SuperNOS, is particularly attractive, Bjelland said. A combined server operating system option would simplify operations and provide a compelling reason for Cargill to stay with NetWare on its 1,000 Intel Corp.-based servers worldwide, he said.

Goodyear said a single server would make it easier for his firm and others to link their LANs to the Internet, on which Unix systems dominate.

SuperNOS will ship by 1996, Frankenberg said.

STICKING WITH NETWARE

Becky Mangum, computer consultant at the Kenan-Flagler Business School at the University of North Carolina in Chapel Hill, came away from technical sessions convinced that NetWare 4.X's directory services are a good reason to stick with NetWare.

She hopes to go back to the university and convince officials there to stick with NetWare rather than switch to IBM LAN Server or Microsoft Windows NT.

But Mangum and other users, such as Richard Ripps, LAN manager of the New York office of AIOC Corp., said Novell still has to better explain why users should migrate to NetWare 4.X from proven NetWare 3.X systems. Mangum wants to see better migration tools — especially for the NetWare Loadable Module applications she now has running atop NetWare 3.X.

While moving from NetWare 2.X to 3.X produced its share of trauma, at least she could be sure that her existing third-party applications would continue to work. In contrast, NetWare 4.X is different enough that many of those applications would need to be upgraded or swapped out, she said.

➾IDG News Service Correspondent Martin LaMonica contributed to this story.

Novell ideas

"I want to stay with Novell. I think they're headed in the right direction."

Becky Mangum, computer consultant, Kenan-Flagler Business School, University of North Carolina

▼▼▼

"Clearly, Novell has not done a good job in the past, articulating who they were and what they were doing."

John Bjelland, vice president of IT and mgmt. application architecture, Cargill, Inc.

▼▼▼

"One of the smartest things [Novell] ever did was acquire WordPerfect."

Larry Thomas, systems manager, Florida Atlantic University

▼▼▼

"Every time I see WordPerfect, I wonder why Novell singled out WordPerfect as the answer."

Ralph Patterson, president, LANAces, Inc.

Novell goes with the flow

Novell, Inc. last week said it will get into the workflow market with a client/server application that takes advantage of the message routing and store of its NetWare and Groupwise applications.

Stewart Nelson, vice president for research and development at the company's Groupware division, which includes the former WordPerfect Corp., said that while the unnamed offering will integrate with Novell's Groupwise messaging applications, it will be sold separately. The application will be aimed at heavy-duty production applications such as insurance claims processing, he added.

The software, to be formally announced in two months, will tie into Novell's Informs forms routing and SoftSolutions, Inc.'s Document Management Applications. They will take advantage of NetWare 4.X's directory services and a new message store Novell is building for Groupwise, he said.

The actual workflow engine will reside on a NetWare server, according to Nelson.

Tom Koulopoulos, president of Delphi Consulting, Inc. in Boston, said the move makes sense, given Novell's purchase of WordPerfect, which already had forms routing and document management software. "They've been sort of inching their way into that," he said.

BY ADAM GAFFIN

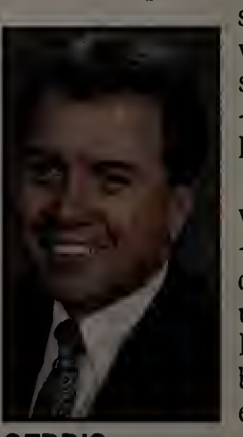
DESKTOP VIDEOCONFERENCING

Intel adds TCP/IP LAN power to ProShare system

BY ELLEN MESSMER

Washington, D.C.

Intel Corp. is adapting its ProShare desktop videoconferencing system, which currently only works over ISDN, for use on TCP/IP-based LANs and WANs.



GEDDIS

The LAN-based ProShare system, which carries picture and voicestreams via TCP/IP packets, will be unveiled by year end, according to sources at Intel.

And in what could resolve the technical barrier to getting systems that support the International Telecommunication Union's H.320 WAN videoconferencing standard to work on LANs, the Intel-led Personal Conferencing Work Group consortium next week will issue its long-awaited specification for desktop conferencing.

According to sources within the group, the Personal Conferencing Work Group specification will define a gateway to convert circuit-switched H.320-compliant audio and videostreams into a LAN-friendly framing format.

The gateway specification, to be proposed as an industry standard for desktop videoconferencing, may win widespread industry backing as a way to link H.320 — which specifically excludes LANs — to a common format for LANs.

"We will implement what comes out of this spec — we have to," said Jim Geddis, president and chief executive officer of InVision, Inc., which makes a LAN-based desktop videoconferencing system for TCP/IP networks.

Joe Luekenoff, AT&T marketing director for business and multimedia visual communications, said AT&T will deploy the Personal

See ProShare, *page 99*

Oracle to roll out groupware offering at user conference

BY BARB COLE

San Francisco

At its user group meeting here next week, Oracle Corp. will unwrap a groupware offering designed to compete with Lotus Development Corp.'s Notes, as well as a new version of its client/server application development suite.

Oracle Documents, a client/server product that will let users share audio, video and SQL data, was first outlined to *Network World* in a February interview with Oracle Chairman Larry Ellison (*NW*, Feb. 7, page 1).

WORKING TOGETHER

The group collaboration product is designed to work hand-in-glove with Oracle7 Version 7.1 relational database; the Oracle Media Server; ConText, Oracle's text search-and-retrieval engine; and Oracle Office, the firm's messaging and scheduling software.

These pieces will be sold separately for Unix servers and Windows clients.

Oracle Documents will mainly be used for managing text, sources said. But by working with Media Server, it will handle video and other multimedia data — something Notes can't do today.

Oracle Documents data will be stored in its engine, but indexes to the information will be stored in an Oracle database. Indexes are methods for keeping track of data in tables, which significantly speeds database performance.

Oracle Documents will also handle SQL-based queries and replication. Notes can replicate data, but it is based on a flat-file database. Sources said Oracle Documents is designed to link to existing Notes databases and will have links to other vendors' electronic mail systems.

"Rather than using a product like Notes for decision support, I can start coordinating work out of the production database," said Keith May, regional director of application services at Vanstar, Inc., a computer reseller in Columbus, Ohio. "It raises some security and resource issues, but it will be powerful

See Oracle, *page 99*

CLARIFICATIONS

A recent article on Advantis testing IBM ATM gear (Aug. 29, page 6) stated the firm had been able to saturate an IBM Nways switch with 30M bit/sec of throughout. In fact, it was a trunk line between two Nways switches that was saturated at that speed.

Correction: Cisco Systems, Inc.'s new AccessPro PC Cards run Cisco's Internetwork Operating System software, not software from subsidiary Newport Systems Solutions, Inc. as previously reported (Sept. 12, page 6).

Lotus launches low-end Notes enhanced message switching

BY ADAM GAFFIN

Atlanta

Lotus Development Corp. last week moved to shore up both ends of its messaging strategy, introducing an inexpensive Notes client and announcing enhancements to its high-end messaging switch.

At the NetWorld+Interop show here, the company also committed to shipping by the end of October new Notes servers for NetWare 4.X, Windows NT and three additional Unix platforms.

Notes Express, the low-cost Notes client, comes with electronic mail and on-line conferencing that takes advantage of Notes' security and replication features at prices about one-third those of standard Notes.

But, while the software uses the same application program interface as regular Notes, Lotus officials emphasized that Notes Express is not a run-time version of Notes. Users will not be able to employ workflow and other advanced applications developed on regular Notes clients and servers.

Jeff Papows, a vice president of Lotus' communications products division, said the new client, initially available in Windows, Macintosh and OS/2 versions, will appeal to enterprises using Notes in some departments that

See **Lotus**, *page 99*

MARK ESCHER

PAPOWS

Start-up set to liven up desktop video

BY ELLEN MESSMER

Waltham, Mass.

Start-up VIVO Software, Inc. this week announced the first H.320-based desktop conferencing product that uses software rather than hardware to compress video images.

Eliminating the hardware coder/decoder in the VIVO320 lowers costs for desktop video and makes codecs another shrink-wrapped product, like a spreadsheet or database, according to the firm's founder and president Staffan Ericsson. "The software does the video processing," he said.

The H.320-based VIVO320 desktop video system, which includes a data-sharing and whiteboard application, runs on a Windows-based 486 personal computer or higher. The VIVO desktop videoconferencing application works over ISDN Basic Rate Interface at 30 frame/sec at up to 128K bit/sec to display a quarter-screen image.

The VIVO320 desktop system interoperates with larger video roll-about and room systems based on the international H.320 videoconferencing standard.

This interoperability has prompted celebration among veteran videoconferencing users. "Our excitement about this is that it is H.320-compatible, so we can use our NEC Corp. H.320 room systems with it," said Frank Kavenik, vice president of development at NationsBanc CRT, the options trading subsidiary of the NationsBanc Corp. banking firm.

NationsBanc CRT, which has been beta-testing the VIVO320 for several months, is seeking a desktop conferencing system for its options traders. Kavenik said the VIVO320 picture quality was fine, while the audio was exceptional.

VIVO320 comes with DataBeam, Inc.'s FarSight 2.0 collaboration software but will work with any data-sharing applications, including Intel Corp.'s ProShare (see story, page 4). VIVO320 also includes the ScreenView Presentation tool that lets an image from a desktop application be transferred to a remote room-based system for viewing and dynamic highlighting and underlining.

The VIVO desktop conferencing software, sold alone, costs just under $1,000. The company is also selling VIVO kits that include the software, a video capture card, a digital camera, a Logitech, Inc. microphone, IBM's WaveRunner ISDN card, a hand-free speaker and a privacy earpiece, all for $1,995.

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CLIENT/SERVER

Digital bucks up DEChub 900, Pathworks

BY JIM DUFFY

Atlanta

Ailing computer giant Digital Equipment Corp. last week bolstered its high-performance client/server computing arsenal with significant enhancements to its LAN hardware and software.

Digital unwrapped two Ethernet switch modules for its DEChub 900 MultiSwitch, including its first switch to deliver dedicated 10M bit/sec to the desktop. Digital also rolled out Release 5.1 of its Pathworks LAN software, which now includes, among other features, object-based and distributed computing technology as standard components.

The enhancements mirror Digital's view of the industry — increasingly sophisticated end users demanding more flexible, high-speed, seamless connectivity options to coworkers, suppliers and customers.

"It's a picture of how we see the market changing — everything you need from the desktop," said Faye Allen, marketing and business development manager for Digital's network operating systems (NOS) group.

The Ethernet switches are called the PEswitch 900TX and DECswitch 900EE.

The PEswitch 900TX is a seven-port Ethernet-to-Fiber Distributed Data Interface switch that delivers dedicated 10M bit/sec bandwidth to the desktop. Six of the ports are 10Base-T Ethernet attachments, the other is a dual-attachment FDDI port.

The switch connects to an FDDI backbone ring through the DEChub 900 or through Digital's DEF1H-A FDDI DEChub One single-slot docking station.

The PEswitch 900TX forwards 14,880 packet/sec and filters 29,000 packet/sec, according to Digital.

The PEswitch costs $3,995 and will be available in November.

The DECswitch 900EE is a six-port backbone device that provides switching between Ethernet segments. It has two attachment unit interfaces and four 10Base-T ports, and supports source address, destination address and protocol-type filtering for 8,000 media access control addresses.

The DECswitch 900EE supports the IEEE 802.1 Spanning Tree Ethernet bridging algorithm. It filters 14,880 packet/sec and forwards 45,000 packet/sec. The device will support multiprotocol routing in the future via a firmware upgrade.

The DECswitch 900EE is priced at $5,995 and will be available in November.

Users are anxious to give Digital's new switches a test run.

"I've been looking at products from a whole different group of vendors," said Jim Hutchinson, network analyst at Children's Hospital in Boston. "This will have a benefit for me since I'm installing the MultiSwitch all over the network" for imaging applications.

The new release of Pathworks for DOS and Windows clients includes: the Mosaic naviga-

See Digital, *page 99*

IBM forges Unix links to SNA networks

BY MICHAEL COONEY

Atlanta

IBM will this week continue the drive to more fully integrate Unix users into Systems Network Architecture environments by licensing connectivity software from CNT/Brixton Systems, Inc.

The software — BrxPU5 SNA Server and BrxPU2.1 SNA Server — will run on top of IBM's AIX SNA Server/6000 to give AIX-based SNA users simultaneous access to legacy and Unix applications. The software will also allow TCP/IP telnet users access to SNA hosts.

Until now, IBM's AIX SNA Server/6000 gave RISC System/6000 users access only to SNA applications on the mainframe.

The new software fills some connectivity gaps in the SNA Server/6000 offering while giving the platform the ability to support downsized applications in the Unix environment, analysts said.

"IBM is feverishly trying to provide users with easy ways to connect SNA and TCP/IP networks," said Todd Dagres, vice president of equity research for the Robinson-Humphrey Company, Inc. here. "It's a case where CNT/Brixton had a reliable product that could quickly fill in some glaring gaps on the SNA Server/6000, so IBM went out and got it."

The first product IBM will deploy on the SNA Server/6000 will be the BrxPU2.1 SNA Server. This software brings TCP/IP telnet, tn3270 and tn5250 support, the most common terminal emulation packages on the market, to

See IBM, *page 8*

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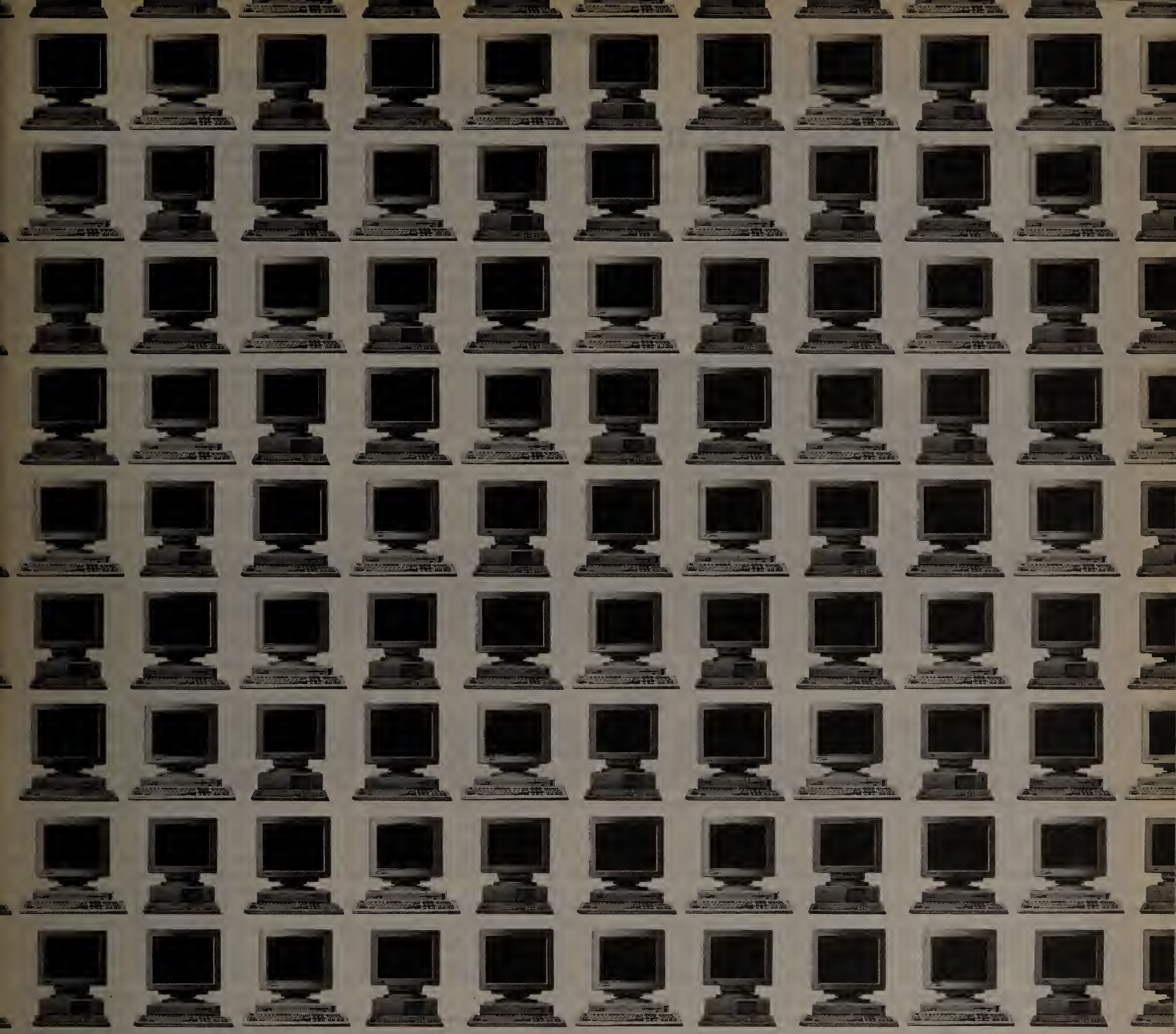

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Circle Reader Service **#28**

IBM, Kalpana unveil new token-ring switch

BY SKIP MACASKILL

Atlanta

The token-ring switching market received a credibility boost last week when IBM and Kalpana, Inc. unveiled a jointly developed Token Ring-to-ATM switch.

The IBM 8272 LANStreamer Token Ring Switch combines IBM Token-Ring chipset with Kalpana's next-generation switch technology to interconnect Token-Ring segments as well as provide access to Asynchronous Transfer Mode networks.

Only one vendor, Standard Microsystems Corp., is currently shipping a token-ring switching product, but start-up Centillion Networks, Inc. has provided details on its switch, which is expected by year end (*NW,* July 4, page 1). Others, including Madge Networks, Inc., have announced their intention to develop products.

The 8272, which supports more than 4,000 media access control addresses, is an eight-port switch that can support a mix of 4M and 16M bit/sec full-duplex Token-Ring connections to separate segments, individual users or heavily used file servers.

The device also features an optional ATM uplink port that can connect the LANStreamer to an ATM switch or to an IBM 8260 intelligent switching hub with an ATM interface. The uplink port will initially run over multimode fiber connections at 155M bit/sec, and different media types and speeds will be supported in future releases.

LANStreamer will switch Token-Ring packets through Kalpana's next-generation matrix switch, converting frames into cells only if the data is destined for the ATM port.

The device employs cut-through switching, meaning packets are switched to their destination as soon as the address header has been read. While that ensures a lower latency than competing store-and-forward switches, it also increases the chances of propagating bad packets on the network since no check-sum is performed.

The new Kalpana matrix switch offers a traffic prioritization scheme, letting users differentiate low from high-priority traffic.

The Kalpana switching engine will also be upgraded to support both 100M bit/sec Ethernet standards (100Base-T and 100VG-AnyLAN) as well as ATM, said Larry Blair, vice president of marketing for Kalpana.

"Token-ring switching, unlike its Ethernet counterpart, is not essentially about relieving bandwidth constraints," said Fred McClimans, principal at Decisis, Inc., a consultancy in Ashburn, Va. "It's designed to replace PS/2-based split bridge environments with multiport Token-Ring support that avoids the complexity of routing."

And it is not for desktop connectivity, McClimans said. "IBM is pushing 100VG-AnyLAN and 25M bit/sec ATM for that. It's also something that IBM apparently feels it couldn't get from Chipcom [Corp.]."

LANStreamer will go into beta test in the fourth quarter, with general availability expected in the first half of 1995. Pricing will be about $600 per port. The ATM interface will be available in the third quarter of 1995, and pricing will be unveiled at that time.

©IBM: (800) 426-2255.

But there's more...

IBM last week also rolled out the following products:

- Autosensing Token-Ring adapters for ISA and PCI machines
- A 32-bit EISA Ethernet adapter
- A 10-slot version of the 8260 intelligent hub
- An 18-port Token-Ring switching module for the 8260
- A 10-port, 10Base-T module, and 20- and 40-port 10Base-T modules for the 8260
- A six-port Ethernet router module for the 8250 intelligent hub
- The 8-port 8271 EtherStreamer Switch
- IBM Intelligent Hub Manager for AIX Version 2.0

IBM

Continued from page 6

the IBM server for the first time. It will allow those users to access SNA mainframe resources or Application System/400 hosts.

The BrxPU2.1 SNA Server acts as a gateway between TCP/IP internets and the SNA backbone. The software emulates an IBM 3174 cluster controller to the SNA host, while looking like a TCP/IP host to devices attached to a TCP/IP net. The number of users that can access the mainframe or midrange hosts is only limited to the server's memory constraints.

The CNT/Brixton software supports any industry-standard tn3270 or tn5250 emulators. Also, since the BrxPU2.1 SNA Server software already runs on Sun Microsystems, Inc. scalable processor architecture (SPARC) and Hewlett-Packard Co. HP 9000 boxes, users connected to those platforms could easily access the SNA environment, as well.

The other CNT/Brixton product, BrxPU5 SNA Server, will let the SNA Server/6000 act as an application server for downsized mainframe programs. BrxPU5 SNA Server emulates a subset of IBM's VTAM and SNA host communications features, enabling the SNA Server/6000 to look like a mainframe.

With this feature, 3270 or tn3270 users can access Unix-based applications or mainframe applications that have been ported to Unix servers. "Users will now have the option of running mainframe applications just about anywhere they want," said Herb Rush, general manager of CNT/Brixton.

The BrxPU5 SNA Server also supports HP 9000 and Sun SPARC workstations.

Multivendor support is what will separate IBM from its competitors, such as Microsoft Corp. (with its Advanced Windows NT SNA Server) and OpenConnect Systems, Inc., analysts said.

Pricing was not announced, but the vendors said the BrxPU2.1 SNA Server will be available by year end. The BrxPU5 SNA Server will roll out in the first quarter of 1995.

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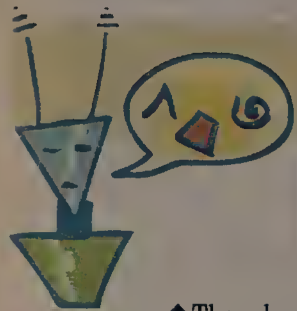

CyberSpeak: *Voices from the reader network*

What was the best thing you saw at NetWorld+Interop?

◆The best thing about Interop was seeing the plethora of products all in one place. But the thing that really stood out the most for me at Interop was the interaction I got to have with other users in the data communications community."

Ron Sanderson, manager of network software and support, Bureau of Communications and Computer Sciences Information Services division, Springfield, Illinois

◆"I like the Groupwise [messaging system setup for show-goers]. I'm going to love going to work tomorrow because I won't have 100 messages waiting for me — I had my staff send my E-mail to me here."

Becky Mangum, computing consultant, Kenan-Flagler Business School, University of North Carolina, Chapel Hill

◆"The continuous, although sometimes chaotic and always confusing, introduction of new products and the entrance of new vendors pushing — and sometimes tearing — the technology envelope. As a result, even the tried-and-true vendors got caught up in trying to produce the latest, biggest or most revolutionary technology thing."

Paul Prasek, principal, SenSys International, Raleigh, N.C.

NextWeek CyberSpeak Out!

New Novell CEO Robert Frankenburg is getting the company back to basics. What do you think of his efforts so far?

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Frame relay

Continued from page 1

ond half of next year, according to Ken Ferrere, a member of AT&T's frame relay product management team. MCI Communications Corp. is likewise looking at the service, while progressing carefully to ensure continuity between the features of its HyperStream frame relay service and local exchange carrier (LEC) services, said Stephen Von Rump, MCI's director of data product marketing.

An end-to-end frame relay service is becoming more critical as companies with multiple locations within the same local access and transport areas (LATA) — such as banks, mortgage companies and retail chains — extend access to key applications to branches and stores, Hokamp said.

Sprint is working with some users that plan to have 2,000 sites on their frame relay nets, Hokamp said. A coordinated service could save these users at least 10% on the total cost of the data network, he said.

An industry rule of thumb holds that a company needs three to five sites within a LATA for frame relay to be cheaper than dedicated lines, according to consultant Thomas Jones, president of New Venture Directions, Inc. in McLean, Va. If a company is replacing a multidrop line, using frame relay to reach each of the sites along that line also makes sense, Jones said.

"We'll have NNI in all our [frame relay] switches by the first half of 1995," Von Rump said.

There are some hurdles to be cleared, however, such as the ordering procedure.

When interexchange carriers (IXC) order LEC circuits for users, it typically takes place through a system developed by Bell Communications Research called the Automated Service Request (ASR).

But the ASR system does not contain fields for key frame relay or Asynchronous Transfer Mode specifications such as committed information rate, constant bit rate or variable bit rate, according to Gordon Reichard, director of broadband development for Ameritech Advanced Data Services.

"It's one thing to order a dedicated circuit," Reichard said. "Now you look at ATM and frame relay, and there's a lot more that has to go into it."

Carriers will also have to complete work on the Network-to-Network Interfaces (NNI) that enable their frame relay nets to be tied together.

The first such NNI was announced between Sprint and US WEST, Inc. last May.

At NetWorld+Interop here last week, Sprint officials said they have completed NNI testing with Bell Atlantic Corp., and similar tests are under way or slated to begin with the other regional Bell holding companies and GTE Telephone Operations within 90 days.

AT&T confirmed it has tested the technology with two RBHCs and is negotiating contracts with all of them. And MCI's Von Rump said, "We'll have NNI in all our [frame relay] switches by the first half of 1995."

Ultimately, the savings depend on how the long-distance carriers price the integrated frame relay service. Their leased-line local access prices are based largely on the LECs' mileage charges plus an access coordination fee. But with frame relay access, they can take advantage of some unique features.

For example, because LECs' frame relay tariffs typically have high port charges but negligible monthly rates per permanent virtual circuit, there is a premium on volume, Hokamp said. And distance-insensitive prices in frame relay could benefit users whose offices are located far from long-distance carriers' points of presence, AT&T's Ferrere said.

Comments?

See "Contacts" box on page 2.

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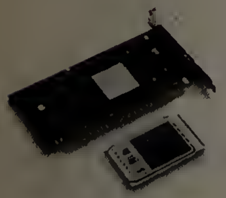

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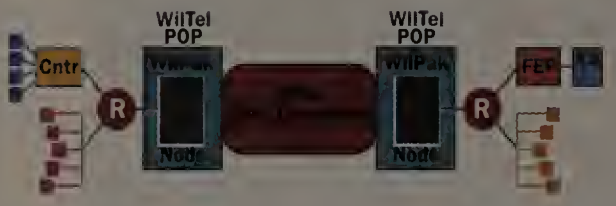

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Circle Reader Service #33

DATABASE DEPLOYMENT

Sybase navigates parallel processing, support courses

BY BARB COLE

Emeryville, Calif.

Sybase, Inc. last week said it will deliver in December its long-awaited Navigation Server, software for running its System 10 databases on parallel processing computers.

Separately, the company announced plans to overhaul its technical support offerings.

Navigation Server, which Sybase delayed for more than a year while fine-tuning it, will initially be available on AT&T Global Information Solutions 3600 computers. By mid-1995, Sybase will roll it out on the AT&T GIS 3550 and IBM SP2, plus parallel processing computers from Hewlett-Packard Co. and Sun Microsystems, Inc., the company said.

Navigation Server manages multiple Sybase System 10 databases running on massively parallel processing or symmetric multiprocessing machines. Running database operations in parallel improves performance and lets users downsize extremely large amounts of data from mainframes.

The product will cost $110,000 for the first CPU and $14,000 for each additional one.

"Navigation Server will address the needs of large corporations that are embarking on huge downsizing or data mining projects," said Norton Greenfield, director of Unix systems and applications at Computer Intelligence InfoCorp., a market research firm in Westborough, Mass.

SUPPORT STRATEGY

Sybase last week also said it will roll out new technical support plans that are simpler for users to understand and add services to its basic level of support.

Under SupportPlus, Sybase will let users choose between four levels of technical support (see graphic). Previously, Sybase had a one-size-fits-all support plan to which customers could add services for a fee.

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Sifting through Sybase support plans

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All plans include software upgrades, access to the private OpenLine CompuServe forum, and subscriptions to CD-ROM documentation and technical material.

MCI rebounds from Nextel deal with wireless service

BY BILL BURCH

Atlanta

MCI Communications Corp. last week announced plans to let users dial in to its X.25 network using analog cellular modems, giving users a new option for provisioning wireless data services nationwide.

MCI plans to offer the service in the nation's top 12 metropolitan areas by December and begin service in 100 additional cities next year. The announcement at the NetWorld+Interop 94 show here comes just weeks after the collapse of MCI's more ambitious wireless plan that involved spending $1.3 billion to purchase a 17% stake in Nextel Communications, Inc.

The Nextel deal would have given MCI entree to both voice and data services. In contrast, the XstreamAir service announced last week will only carry data, with local cellular networks providing access to the carrier's X.25 network.

The new network will let MCI leverage "the large cellular base that's out there and allow companies to leverage the scope and power of their existing applications," said

See MCI, *page 101*

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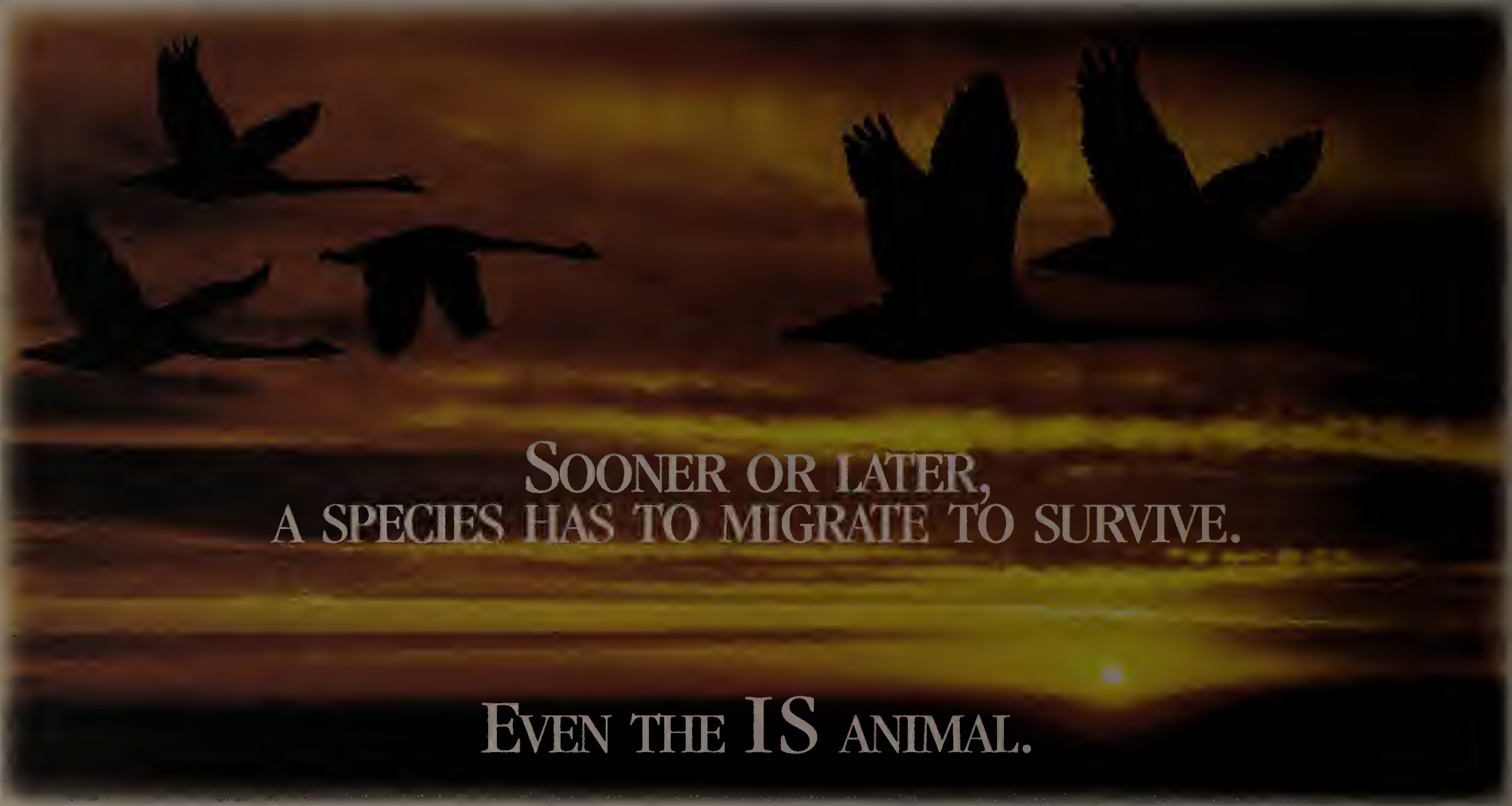

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NETWORK WORLD
The Newsweekly of Enterprise Network Computing

Mailing Address: (If different from company address)
Address1 ____________________
Address2 ____________________
City ____________________ State ____ ZIP ______

1 Industry: (check one only)

01 ☐ Manufacturers (other)
02 ☐ Finance/Banking
03 ☐ Insurance/Real Estate/Legal
04 ☐ Healthcare Services
05 ☐ Hospitality/Entertainment/ Recreation
06 ☐ Media/TV/Cable/Radio/Print
07 ☐ Retail/Wholesale Trade/Business Services
08 ☐ Transportation
09 ☐ Utilities
10 ☐ Education
11 ☐ Process Industries (Mining/Construction/ Petroleum Refining/ Agriculture/Forestry)
12 ☐ Government Federal/State/Local
13. ☐ Military
14. ☐ Aerospace
15 ☐ Consultants (Independent)
16. ☐ Carriers/Interconnects
17. ☐ Manufacturers (Computer/ Communications)
18. ☐ Systems/Network Integraters (VAR/VAD/ VAN/Systems/Software Houses)
19 ☐ Distributors Communications/ Computers
20. ☐ Other__________

2 What is your Job Function? (check one only)

NETWORK IS Management:

1 ☐ Networking Management
2 ☐ LAN Management
3 ☐ Datacom/Telecom Management
4 ☐ IS,IT,MIS,Systems Management
5 ☐ Engineering Management
6 ☐ Corporate Management(CIO,CEO,PRES,VP DIR,MGR,Financial Management)
7 ☐ Consultant (Independent)
8. ☐ Other__________

3 What is the total number of sites for which you have purchase influence? (check one only)

1 ☐ 100+
2 ☐ 59 - 99
3 ☐ 20 - 49
4 ☐ 10 - 19
5. ☐ 2 - 9
6 ☐ 1
7 ☐ None

4 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. SCOPE (check one only)
1 ☐ Corporatewide
2 ☐ Multienterprise
3 ☐ Departmental
4 ☐ None

B. INVOLVEMENT (check all that apply)
1. ☐ Recommend/Specify
2 ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ None

5 Check ALL that apply in columns A and B:

A: I am involved in the purchase of the following products/services.
B: I plan to purchase the following products/services.

A B LOCAL AREA NETWORKS
☐ 01 ☐ Local Area Networks
☐ 02 ☐ Network Operating Systems Software (NOS)
☐ 03. ☐ LAN Storage Devices (optical, tape, disk etc.)
☐ 04 ☐ LAN Backup Systems (optical, tape, disk etc.)
☐ 05 ☐ Network Test Equipment/Diagnostic/ Management Software
☐ 06 ☐ Hubs/Intelligent Hubs
☐ 07 ☐ Cables, Connectors, Baluns
☐ 08 ☐ UPS
☐ 09 ☐ Network Adapter Boards/Network Interface Cards
☐ 10 ☐ Peer-to-Peer LANs
☐ 11 ☐ Wireless Networks
☐ 12 ☐ SNMP Network Management
☐ 13 ☐ ATM Switches
☐ 14 ☐ Remote LAN Access
☐ 15 ☐ Ethernet Switches
☐ 16 ☐ LAN Servers
☐ 17 ☐ Superservers
☐ 18 ☐ Remote Access/Communications Servers

A B REMOTE/WIRELESS COMPUTING
☐ 19 ☐ Laptops
☐ 20 ☐ Notebooks
☐ 21 ☐ PDAs
☐ 22 ☐ PCMCIA
☐ 23 ☐ Mobile Data Services
☐ 24 ☐ Wireless Data Services
☐ 25 ☐ Wireless Data Equipment

A B INTERNETWORKING
☐ 26 ☐ Bridges
☐ 27 ☐ Routers
☐ 28 ☐ Gateways
☐ 29 ☐ Bridge/Routers

A B COMPUTERS/PERIPHERALS
☐ 30 ☐ Micros/PCs
☐ 31 ☐ Minis
☐ 32 ☐ Mainframes
☐ 33 ☐ Workstations
☐ 34 ☐ Front-End Processors
☐ 35 ☐ Terminals
☐ 36 ☐ Printers
☐ 37 ☐ Cluster Controllers
☐ 38 ☐ Fax Machines
☐ 39 ☐ Monitors

A B SOFTWARE/APPLICATIONS
☐ 40 ☐ Network Management
☐ 41 ☐ Systems Management
☐ 42 ☐ Micro to Mainframe
☐ 43 ☐ Security
☐ 44 ☐ Communication/Terminal Emulation
☐ 45 ☐ Word Processing
☐ 46 ☐ Operating System
☐ 47 ☐ Client Server Applications Development

A B SOFTWARE/APPLICATIONS (cont'd)
☐ 48. ☐ Applications Development
☐ 49 ☐ Data Base Management/RDBMS
☐ 50. ☐ Spreadsheet
☐ 51. ☐ Groupware
☐ 52 ☐ EDI
☐ 53 ☐ E-Mail
☐ 54 ☐ Windows/Graphical User Interface
☐ 55 ☐ 4GL Development/Case
☐ 56 ☐ Multimedia
☐ 57 ☐ Graphics/DTP
☐ 58 ☐ Remote Access
☐ 59 ☐ Imaging
☐ 60 ☐ Suites
☐ 61 ☐ Middleware
☐ 62 ☐ Document Management

A B WIDE AREA NETWORKS EQUIPMENT & SERVICES
☐ 63. ☐ Modems (9.6K bps and over)
☐ 64 ☐ Modems (under 9.6K bps)
☐ 65 ☐ T-1/T-3 Multiplexers
☐ 66. ☐ T-1/T-3 Services
☐ 67 ☐ Inverse Multiplexers
☐ 68 ☐ Fractional T-1
☐ 69. ☐ SMDS
☐ 70 ☐ ATM (Asynchronous Transfer Mode)
☐ 71. ☐ Matrix Switches
☐ 72 ☐ Packet Switches
☐ 73 ☐ Protocol Converters
☐ 74 ☐ Diagnostic/Test Equipment
☐ 75. ☐ DSU/CSU
☐ 76 ☐ Microwave
☐ 77 ☐ Fax Boards/Modems
☐ 78. ☐ VSAT
☐ 79 ☐ Fiber Optic
☐ 60 ☐ Satellite
☐ 81 ☐ ISDN
☐ 82 ☐ PBXs (over 1000 lines)
☐ 83 ☐ PBXs (under 1000 lines)
☐ 84 ☐ Automatic Call Distributors
☐ 85. ☐ Voice Messaging Systems
☐ 86 ☐ Videoconferencing/Teleconferencing
☐ 87 ☐ Voice Response/Processing
☐ 88 ☐ Dedicated Leased Line
☐ 89 ☐ Switched Data
☐ 90. ☐ E Mail/Online Services
☐ 91 ☐ Image Processing
☐ 92. ☐ 800/900 Services
☐ 93. ☐ WATS/MTS
☐ 94 ☐ International
☐ 95 ☐ Virtual Networks
☐ 96 ☐ Frame Relay
☐ 97 ☐ Value Added Services
☐ 98 ☐ CTI (Computer Integrated Telephony)

☐ 99 ☐ None of the above (1-98)

6 What is the total number of LANS, Workstations/Nodes: At this Location/ In your Organization?

	At This Location: LANs		Workstations/ Nodes		Entire Organization: LANs		Workstations/ Nodes
1	☐	5000+	☐	1	☐	5000+	☐
2	☐	1,000 - 4,999	☐	2	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐	3.	☐	100 - 999	☐
4	☐	50 - 99	☐	4.	☐	50 - 99	☐
5.	☐	10 - 49	☐	5.	☐	10 - 49	☐
6.	☐	9 or less	☐	6.	☐	9 or less	☐
7	☐	None of the above	☐	7	☐	None of the above	☐

7 Which of the following network platforms are currently installed/planned? (check all that apply)

Installed Planned
A B

NETWORK ARCHITECTURES
☐ 01 ☐ SNA
☐ 02. ☐ DECNET
☐ 03. ☐ MAP/TOP
☐ 04 ☐ TCP/IP
☐ 05. ☐ DCA (Unisys)
☐ 06. ☐ X.25
☐ 07 ☐ Novell IPX/SPX
☐ 08 ☐ APPC/APPN/LU6.2
☐ 09. ☐ NETBIOS
☐ 10 ☐ OSI
☐ 11 ☐ APPLETALK
☐ 12. ☐ NSF
☐ 13. ☐ XNS
☐ 14 ☐ OTHER__________

NETWORK OPERATING SYSTEM
☐ 15. ☐ LOCALTALK (APPLETALK)
☐ 16 ☐ BANYAN (VINES)
☐ 17. ☐ DCA (IRMALAN)
☐ 18. ☐ DCA (10-NET)
☐ 19 ☐ IBM (LAN SERVER)
☐ 20. ☐ IBM (PC LAN PROGRAM)
☐ 21. ☐ MICROSOFT (LAN MANAGER)
☐ 22 ☐ NOVELL (NETWARE, 2X, 3X, 4X)
☐ 23. ☐ PROTEON (PRONET)
☐ 24 ☐ 3COM (3+ 3+OPEN)
☐ 25 ☐ ARTISOFT (LANTASTIC)
☐ 26 ☐ HAYES (LANSTEP)
☐ 27 ☐ DEC (PATHWORKS)
☐ 28. ☐ WINDOWS NT/ADVANCED SERVER
☐ 29 ☐ OTHER__________

Installed Planned
A B

LAN ENVIRONMENT
☐ 30 ☐ 4M TOKEN RING
☐ 31. ☐ 16M TOKEN RING
☐ 32. ☐ ARCNET
☐ 33. ☐ ETHERNET
☐ 34 ☐ 100 M ETHERNET
☐ 35. ☐ STARLAN
☐ 36. ☐ FDDI
☐ 37 ☐ LOCAL TALK
☐ 38 ☐ 10BASE-T
☐ 39 ☐ ATM
☐ 40. ☐ OTHER__________

COMPUTER OPERATING SYSTEM
☐ 41 ☐ DOS
☐ 42 ☐ UNIX/XENIX/AIX
☐ 43 ☐ OS/2
☐ 44 ☐ OS/2 X
☐ 45 ☐ IBM MVS
☐ 46. ☐ IBM VM
☐ 47 ☐ DIGITAL VMS
☐ 48 ☐ MACINTOSH
☐ 49 ☐ WINDOWS
☐ 50 ☐ WINDOWS NT
☐ 51 ☐ X WINDOWS
☐ 52. ☐ SOLARIS
☐ 53. ☐ OTHER__________

☐ 54. ☐ NONE OF THE ABOVE (1-53)

8 For which areas outside of the U.S. do you have purchase influence? (check all that apply)

1. ☐ Europe
2 ☐ Asia
3. ☐ South America
4 ☐ Australia
5. ☐ Middle East
6 ☐ None

9 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

	Mainframes		Minis			Mainframes		Minis	
	Installed	Planned	Installed	Planned		Installed	Planned	Installed	Planned
01 IBM	☐	☐	☐	☐	06 DATA GENERAL	☐	☐	☐	☐
02. DIGITAL	☐	☐	☐	☐	07 HP	☐	☐	☐	☐
03. AMDAHL	☐	☐	☐	☐	08 TANDEM	☐	☐	☐	☐
04 AT&T	☐	☐	☐	☐	09 UNISYS	☐	☐	☐	☐
05. BULL HNIS	☐	☐	☐	☐	10 OTHER______	☐	☐	☐	☐

Which of the following do you have installed/planned: (USE NUMBERS ONLY)

	At This Location		Entire Organization	
	Servers	Clients/Nodes	Servers	Clients/Nodes
11 POWER MACINTOSH				
12 MACINTOSH OTHER				
13. POWER PC BASED				
14 PENTIUM BASED				
15. 80486 BASED				
16 80386 BASED				
17 80286 BASED				
18. 80806/80808 BASED				
19 ALPHA BASED				
20 RISC/UNIX BASED WORKSTATIONS				
21 OTHER				

10 What is the estimated value of networking equipment and services that you help specify, recommend or approve annually? (check one only)

01 ☐ $100 million and over
02 ☐ $50 - $99.9 million
03 ☐ $25 - $49.9 million
04 ☐ $20 - $24.9 million
05 ☐ $10 - $19.9 million
06 ☐ $5 - $9.9 million
07 ☐ $1 - $4.9 million
08 ☐ $500,000 - $999,999
09. ☐ $499,999 or less
10. ☐ NONE OF THE ABOVE

11 Estimated gross annual revenues of your entire company/institution: (check one only)

1 ☐ Over $10 billion
2 ☐ $1 to $9.9 billion
3 ☐ $500 to $999.9 million
4 ☐ $100 to $499.9 million
5 ☐ $50 to $99.9 million
6 ☐ $10 to $19.9 million
7 ☐ $5 to $9.9 million
8 ☐ $4.9 million or less
9 ☐ NONE OF THE ABOVE

12 Estimated number of employees for your entire corporation: (check one only)

1 ☐ Over 10,000
2 ☐ 5,000 - 9,999
3 ☐ 2,000 - 4,999
4 ☐ 1,000 - 1,999
5 ☐ 500 - 999
6 ☐ 499 or less

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BROADBAND ALTERNATIVES

Charles Schwab discovers ATM is mute for T-3 nets

BY MICHAEL CSENGER

San Francisco

Charles Schwab & Company, Inc., one of a small cadre of organizations that can afford today's wide-area broadband services, is finding that data traffic alone does not command its network design.

Earlier this year, Charles Schwab completed an 18-month installation of nine 45M bit/sec T-3 nodes linking six call centers around the country. The network carries in-house data and voice traffic, but most of its bandwidth is reserved for customer calls to these six centers.

Attached to this backbone are another 200 branch offices that pipe data over T-1 leased lines and lower speed frame relay services.

"Our T-3 [network] is paid for by voice traffic," said Derek Archer, Charles Schwab's senior design architect of architecture and information technology, based here.

"But our data requires moving, as well. And as we start building a client/server environment that's going to feed out to our remote offices, we decided first to increase the backbone between call centers," Archer said.

Charles Schwab's data resources are 75% mainframe-based; the rest are LAN-based. The firm is now evaluating its mainframe applications to decide which can be most sensibly migrated to a client/server approach.

While the mainframe will never disappear, Archer said, the idea is to expand with newer networking technology while pruning the mainframe for cost savings and performance.

Driving the backbone growth are applications such as Charles Schwab's TeleBroker service, a voice-automated trading system that handles more than 14 million calls a year. Standard telephone brokerage services through Charles Schwab's call centers also handle about 4,000 customers daily.

These voice calls are bundled by Charles Schwab's carriers onto channelized T-3 circuits that feed into private T3plus Networking, Inc. BMX45 multiplexers. The BMX45s are then connected to each other over a combination of leased T-3 or T-1 links, depending on the volume of traffic to a particular call center.

Each BMX45 feeds inbound customer calls and data traffic to the call center, while multiplexing outbound data, voice and LAN traffic to other locations.

Charles Schwab customer trading terminals span more than 200 branch offices.

Archer said he chose the T3plus equipment for its array of interfaces. The BMX45s provide High Speed Serial Interfaces, Synchronous Optical Network (SONET) fiber ports and non-channelized T-3 interfaces that will support such advanced technologies as ATM.

Archer said he is looking closely at using ATM services between call centers to provide flexible bandwidth.

"We have to react very quickly to volatility in the [trading] market," Archer said. "At times when we have to double capacity within minutes, the call centers go crazy, and this requires that we have at hand a lot of expensive spare capacity.

"It would be nice, instead, to just turn on the tap and increase our bandwidth as needed" using ATM, Archer said.

But ATM requires voice capabilities before it will suit Charles Schwab's needs. "Our company makes its money on voice traffic, and without that capability, we don't have a lot of choices about ATM over the next 18 months," Archer said.

Standards for handling voice over ATM are not yet in place, however, and the ATM Forum is not expected to start dealing with the issue until the middle of next year.

Charles Schwab is considering alternatives in the meantime. SONET OC-3 services at 155M bit/sec might quench the company's thirst for bandwidth, for example, and Archer said he will probably order a SONET link between two call centers early next year.

But the bulk of Charles Schwab's network nodes — trading terminals used by customers in more than 200 remote offices— are linked to the network via 9.6K bit/sec dial-up lines. Those sites are being upgraded to frame relay services at 56K bit/sec and faster.

"What we'd really like for the backbone is something as simple to work with as frame relay," Archer said. "We have to cross so many carrier boundaries that the simple mechanics of interworking can become a real chore.

"That's one of the problems when we look at the SONET alternative," he said. "So a lot of our looking ahead has to factor the services this way." ◻

BRIEFS

Eicon Technology Corp. of Montreal last week announced that its **InterConnect Server (ICS) for NetWare NLM** is one of the first NetWare server-based Systems Network Architecture internetworking products certified to interoperate with RFC 1490 frame relay nets built with IBM 3745 front-end processors.

With ICS for NetWare, LAN- or Synchronous Data Link Control-attached SNA devices such as personal computers, 3174s or Application System/400s can directly access IBM mainframe applications across 3745-based private frame relay networks.

The program can also route IP, IPX and AppleTalk over frame relay networks. The ICS for NetWare will be available next month for $2,995.

Eicon: (800) 803-4266.

Penril Datability Networks, Inc. last week introduced its Network in a Box, a one-stop **remote office package** that includes everything — cabling, adapters, routers, modems and remote access servers — for remote net connectivity. Penril's idea is to simplify the purchase and installation of outlying network sites.

Pricing depends on configuration and includes all consulting and technical support to get the systems running. Network in a Box will be available Oct. 1.

Penril: (301) 921-8600.

Data Race, Inc. last week announced a T-1 drop-and-insert module that lets a T-1 line be plugged directly into its Mach DSplus line of low-speed **data/voice multiplexers.**

The company also introduced the Machnet Multipoint Bridge module, which extends Ethernet connectivity to remote offices over a single data/voice multiplexed connection.

The Mach DSplus T-1 capability will be available first-quarter 1995 for $2,495. The Machnet Multipoint Bridge will be available in the fourth quarter. Pricing was not provided.

Data Race: (800) 329-7223.

NEC America's Data Communications Systems Division, which sells the **Dr. BonD dial-up router,** last week announced a new software configuration tool that lets any novice accurately set up a Dr. BonD node. According to NEC, such networking ease is crucial at remote sites in order to spare the cost of expert installation.

The new feature is available now.

NEC: (800) 222-4632.

Netlink intros frame relay access device

BY MICHAEL COONEY

Raleigh, N.C.

Netlink, Inc. last week took another step toward establishing a foothold in users' branch offices by announcing a new frame relay access device for its new OmniLinx family of switches.

The OmniLinx 4000 integrates LAN routing and packet switching technology, which allows the device to send Systems Network Architecture and Synchronous Data Link Control, asynchronous, bisynchronous, TCP/IP and Novell, Inc.'s IPX protocols from remote sites over public or private frame relay networks.

Netlink announced its OmniLinx family of remote access switches last month in an attempt to break into the internetworking market. Until now, the firm specialized in SDLC-to-Logical Link Control 2 conversion products.

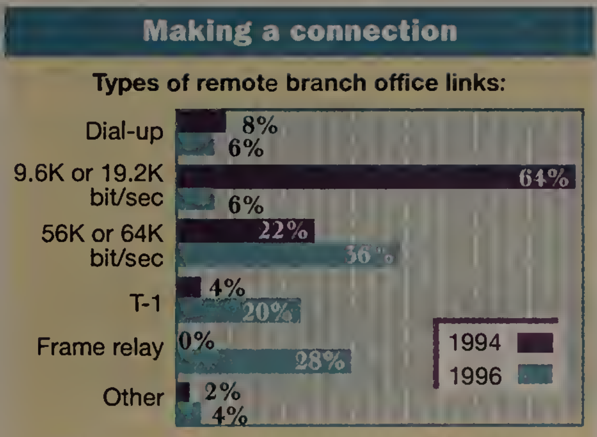
"We want to provide users a simple, inexpensive way of delivering mixed SNA and LAN traffic from small remote branch offices," said Darrick Finan, a product manager with Netlink.

"Users can set up the OmniLinx as a simple frame relay access device that connects SNA users and hosts over the frame relay net, while at the same time it will route LAN protocols to other routers or LANs," he said.

The box supports the Routing Information Protocol and Open Shortest Path First routing protocols.

INTERFACE SUPPORT

The OmniLinx comes with four universal ports that can be configured to support a variety of interfaces. For example, the box can support a single T-1 WAN link, plus any blend of token-ring or Ethernet LAN or serial interfaces in the other three ports simultaneously.



Based on a survey of 50 of the largest 1,000 U.S. firms.

SOURCE: FORRESTER RESEARCH, INC., CAMBRIDGE, MASS.
GRAPHIC BY TERRI MITCHELL

The OmniLinx 4000 can be positioned as a low-end feeder box to Netlink's OmniLinx 6000 or as a stand-alone unit. The OmniLinx 6000 supports a mix of two token-ring or Ethernet LANs and as many as four T-1 wide-area links.

The box is compliant with the Internet Engineering Task Force's RFC 1490, so it can link to any other RFC 1490-compliant box. RFC 1490 defines how multiprotocol devices communicate over frame relay networks.

Most frame relay access devices require another device at the other end of a frame relay link and do not

See **Netlink**, *page 22*

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Advanced Bus Architecture	PCI	VL		
Integrated Networking Interface	32-bit	16-bit		
Integrated, multiprotocol Boot-ROM	X	X		
ISA Plug-n-Play Compliant	X	X	X	
Multilevel Security Features	X	X	X	X
Asset tracking	X	X	X	
PC tattooing	X	X	X	
Optional Desktop Management Software	X	X		
Bi-directional parallel port	X	X	X	X
Desktop Management Interface (DMI)[3]	X	X		

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- *210-MB, 14-ms Fast-IDE hard drive*[1]
- *32-bit PCI IDE hard disk interface*

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Circle Reader Service #34

Cisco preps blueprint for switched internets

BY JIM DUFFY

PRIMER

Cisco Systems, Inc. believes it has a road map for users looking to migrate from shared-media LAN internetworks to high-performance switched virtual networks: its CiscoFusion architecture.

The architecture hinges on LAN switching at the workgroup level and Asynchronous Transfer Mode switching at the campus and enterprise backbone levels. It also defines a central "route server" dedicated to maintaining routing tables and defining paths through the network.

Cisco contends that these components will help users build scalable, distributed networks that can easily accommodate high-bandwidth applications and changes in configuration.

Analysts say CiscoFusion is similar to the switched internetworking strategies of its competitors.

"The top group of internetworking vendors all share more or less the same story," said Jay Batson, senior analyst in the Network Strategy Service at Forrester Research, Inc. in Cambridge, Mass. "It's some kind of ATM switch that replaces the core router as a principal way to get packets from one major segment to another major segment. But ATM switching will be nowhere without routing."

CiscoFusion's core ATM-based switching engine can simultaneously transmit voice, data and video traffic, and scales to high speeds, making it appropriate for handling multimedia and imaging applications.

Also, because it is a switched, connection-oriented technology, ATM allows a virtually unlimited number of users to have dedicated high-speed connections with each other and with high-performance network servers without degradation of service.

The role of LAN switches in CiscoFusion is to increase throughput by providing dedicated LAN bandwidth to users' desktop, Cisco said.

LAN switches can also group end stations into virtual LAN workgroups, whereby networks are arranged by logical, rather than physical, groupings. If a network administrator wants to move an end station to a different workgroup, the administrator, through software, can reassign the station's port to a different virtual LAN.

This eases the process of moving, adding and changing users in or among workgroups because network administrators do not have to change physical wiring structures or addressing schemes, the company said. These tasks are necessary in today's shared-media LANs because end stations in the same workgroup are physically connected to the same hub, and hubs are interconnected by routers.

According to Cisco, virtual LAN switches must be able to switch at Layer 3 of the Open Systems Interconnection protocol stack as well as Layer 2, which they do today, in order to support scalability and network growth. Layer 2 switching provides a form of bridging, while Layer 3 brings routing intelligence to the switches.

But instead of requiring the LAN switch to assemble routing tables — which consumes processing cycles and adds cost and administrative complexity — CiscoFusion relies on routers and ATM switches for route calculation duties. In this capacity, a route server directs packets but does not interconnect workgroups as traditional routers do. That's left to the switches.

Route servers maintain routing tables and flow control data, as well as define virtual paths throughout the net. They periodically dump this information into the cache memory of LAN switches so the switches can make routing decisions for the end stations in their workgroups, or workgroups in their domains.

This means fewer routers are needed in the network because routing intelligence is concentrated in the route servers.

Cisco believes that segregating the switching and routing functions allows the network to scale, and it optimizes route calculation and packet and cell switching performance.

Even though major internetworking vendors like Cisco are now articulating switching strategies, router-based internetworks will not disappear overnight.

"Right now, [switching] is somewhat of a tactical decision for certain types of applications that represent about 5% of the LAN applications that exist today," said John DePietro, WAN analyst at International Data Corp. in Framingham, Mass. "Shared-media routers will really be the preferred means of internetworking networks for the next couple of years. Cisco's strategy is to slowly migrate those people to that [switched] environment." ◼

Comments?
See "Contacts" box on page 2.

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Circle Reader Service #38

ACT exhibits voice and video over frame relay

BY MICHAEL CSENGER

Atlanta

ACT Networks, Inc. last week demonstrated the newest, smallest version of its frame relay access multiplexers as it prepared additional interfaces and modules for a later announcement this year.

ACT's Speech Data Multiplexer-Junior Fast Packet (SDM-JFP) is a branch office frame relay access device that multiplexes voice, data and fax traffic over public or private frame relay services. It joins ACT's original SDM-FP, a slightly larger version that serves regional offices or central sites. Neither product is a switch; both serve as access multiplexers with a focus on carrying voice traffic over frame relay networks.

Both products support wide-area links up to 128K bit/sec. The SDM-JFP can divide this bandwidth among two data channels and as many as four voice/fax cards. Each card supports one voice/fax line with variable levels of voice compression.

The new product — on display at NetWorld + Interop here last week — was developed to meet the pricing needs of users outfitting smaller sites, said John Reidy, ACT's director of market development.

At a base price of $2,250, the SDM-JFP is $1,350 cheaper than the SDM-FP, which supports six data channels and as many as eight voice/fax cards.

"We found that a lot of remote sites have lower connectivity requirements, so this smaller version would pay for itself more quickly," Reidy said.

SDM-JFP Network Access Multiplexer highlights

Availability: End of October

Price: Base. $2,250
Voice cards. $1,300
Voice/fax cards. . .$1,500

Top features:

- Multiplexes data and voice/fax traffic over frame relay links
- WAN speeds up to 128K bit/sec
- 2 data channels
- 4 slots for optional voice/fax cards
- Voice compression to 8K bit/sec

All cards are interchangeable with ACT's larger SDM-FP.

ACT is able to support voice over frame relay by chopping traffic into frames no larger than 65 bytes. Along with optimized buffers at the receiving end, this tactic avoids jitter caused by variable delay through the network.

"If your switch or your carrier gives you the [committed information rate] that you expect, then running voice through our equipment is no problem," said Chris Talbot, ACT's ACTnet product manager.

BIGGER, FASTER

Atlantic Security Bank in Miami has used ACT equipment since last year in a network that uses satellite hops to connect several offices from New York to Lima, Peru.

"We might have a need for a smaller box, but right now, we're expanding the network and running out of room here," said Ray Guzman, Atlantic's data processing and telecommunications manager.

"I need larger capacity at the central site and more voice cards in Panama [a remote branch]" Guzman said. Users have complained that voice circuits served by the ACT equipment have been too busy lately, "which shows me that people are using the network."

Voice quality is fine, and the company saves on expensive international toll charges with each call.

By the end of this year, ACT will announce WAN support for up to 512K bit/sec frame relay links, Reidy said. ACT will also introduce data modules that can be used in the slots that now support only voice/fax modules, giving users the option of adding more data ports as needed.

All modules will be interchangeable between the SDM-JFP and SDM-FP.

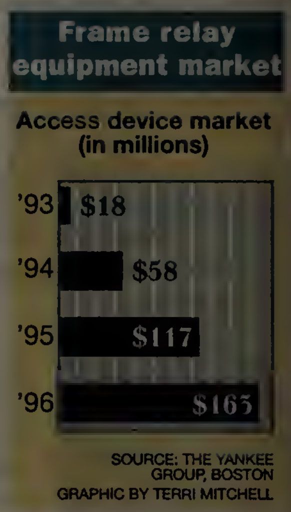
At the show last week, ACT also demonstrated videoconferencing over frame relay, using the SDM-JFP and third-party packet video equipment.

ⒸACT: (805) 388-2474.

Netlink

Continued from page 17

support routing functions; although Netlink competitor Sync Research, Inc. does offer an access device that is RFC 1490-compliant and does not require a second box.



Frame relay equipment market

SOURCE: THE YANKEE GROUP, BOSTON
GRAPHIC BY TERRI MITCHELL

While the OmniLinx 4000 supports its own switching, routing and traffic priority features, it does not include the OmniLinx 6000's SmartStream software, which supports multiple SNA transport classes as well as other priority-enabling techniques.

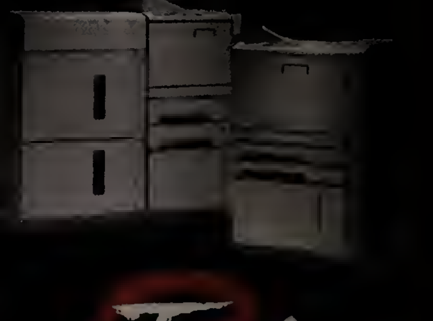
"We didn't feel that the branch office user needed all of the features found in SmartStream," Finan said. "The differentiating factor with the OmniLinx 4000 is its ability to act as [an acess device] and a router at the same time."

"Netlink is offering branch users an efficient way of handling SNA and LAN traffic," said Tom Nolle, president of the CIMI Corp. consultancy in Voorhees, N.J. "Utilizing the SmartStream software in the OmniLinx 4000 might have made it more attractive."

Also, like the OmniLinx 6000, the new box can not be managed by host-based NetView systems. It can be managed via any Simple Network Management Protocol-based platform.

The OmniLinx 4000 will be available this month for $4,000.

ⒸNetlink: (919) 878-8612.



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INTERNETWORKING MONITOR

by Scott Bradner

Call it vacation

Oops! Deadline time again!

It's Sunday morning as I write this, and I have to head off to Net-World+Interop in a few hours. So I'm going to claim to be on vacation this week and fill space with a collection of tag lines that people put on their E-mail and a few things that have shown up from various fortune cookie programs. Part of this collection was posted to one of the humor mailing lists, but by the time I got it, all attribution had been removed; so thanks to whomever you are. A low-impact column. Back to sometimes harsh reality next time.

What passes for wisdom in the computer world:

- Pentiums melt in your PC, not in your hand.
- Daddy, why doesn't this magnet pick up this floppy disk?
- C program run. C program crash. C programmer quit.
- Adding manpower to a late software project makes it later.
- The secret of the universe is @*&!! NO CARRIER!
- A bug in the code is worth two in the documentation.
- Did anyone see my lost carrier?
- Error, no keyboard — press F1 to continue.
- From an IBM maintenance manual (1925): "By all means, do not use a hammer."
- Ever notice how fast Windows runs? Neither did I.
- Double your drive space — delete Windows!

A few truisms:

- Friends help you move. Real friends help you move bodies.
- Make it idiot-proof and someone will make a better idiot.
- A flashlight is a case for holding dead batteries.

- Hard work has a future payoff. Laziness pays off now.
- Given a fifty-fifty chance, you will be wrong 90% of the time.
- IRS: We've got what it takes to take what you've got.
- All generalizations are false, including this one.
- A little inaccuracy sometimes saves tons of explanation.
- Change is inevitable, except from a vending machine.
- He who laughs last thinks slowest.
- Always remember you're unique, just like everyone else.
- Two is not equal to three — not even for large values of two.
- Artificial intelligence usually beats real stupidity.
- A closed mouth gathers no foot.
- A good scapegoat is hard to find.

Some definitions:

- Lottery: A tax on people who are bad at math.
- Puritanism: The haunting fear that someone, somewhere may be happy.
- Consciousness: That annoying time between naps.

Positive self-image:

- I'm as confused as a baby in a topless bar.
- The gene pool could use a little chlorine.
- Oops. My brain just hit a bad sector.
- I used to have a handle on life, then it broke.

Humor:

- Very funny, Scotty. Now beam down my clothes.
- When there's a will, I want to be in it.
- We have enough youth, how about a fountain of smart?
- A cauliflower is nothing but cabbage with a college education.
- Give me ambiguity or give me something else.

For old columns' sake:

- "Criminal lawyer" is a redundancy.

Disclaimer:

- "After all, all he did was string together a lot of old, well-known quotations."

— H. L. Mencken (on Shakespeare)

➥ Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu.

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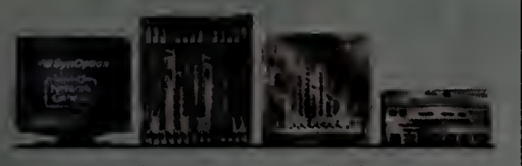
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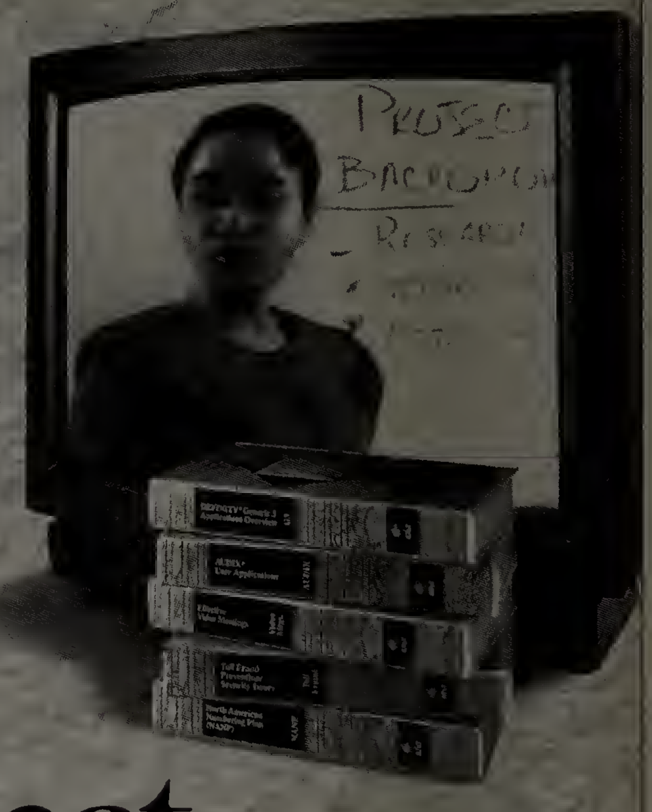

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BRIEFS

Thomas-Conrad Corp. last week announced it has joined the **Fast Ethernet Alliance,** a multivendor group focused on defining the 100Base-T standard for running Ethernet at 100M bit/sec. With the addition of the Austin, Texas-based firm, the alliance includes 60 members.

Cupertino, Calif.-based **Symantec Corp.** last week expanded the client support of the **network management** utility within its Norton Administrator for Networks management package to include Macintosh and OS/2 workstations. Norton Administrator automates several manual LAN management tasks, such as hardware and software inventory, software distribution and personal computer license meterings. DOS and Windows clients were previously supported.

Symantec: (800) 441-7234.

In separate announcements last week, San Diego-based **Solectek Corp.** and Mountain View, Calif.-based **Proxim, Inc.** bulked up their **wireless LAN** offerings.

Solectek rolled out its AirLAN/Campus Area Network product suite, which allows roaming laptop and personal computer users to connect to both wired and wireless Ethernet LANs within a campus. The product set includes AirLAN/Access, a wireless hub that adds an area of 50,000 square feet to a typical office environment. Also new is AirLAN/Bridge Plus, a wireless bridge for linking users at full network speed to buildings five miles apart. Both products are available now and cost $2,499 and $5,495, respectively.

Proxim introduced RangeLAN2, a 2.4-GHz spread spectrum wireless LAN adapter that provides data throughput of up to 1.6M bit/sec. The Industry Standard Architecture-based adapter includes both the spread-spectrum radio and network controller software for $2,950.

Solectek: (619) 450-1220; Proxim: (415) 960-1630.

Santa Clara, Calif.-based **Castelle, Inc.** last week announced the latest version of its **facsimile server software,** FaxPress 3.5. It features a redesigned installation program that is menu-driven, automatic paper size selection, support for Microsoft at Work, and CCITT subaddressing to automatically route incoming faxes to net printers or individual desktops, among other enhancements.

FaxPress is a hardware fax server for Novell, Inc. NetWare environments that can send and receive faxes from E-mail applications.

FaxPress 3.5 will be available next month. Pricing will be announced at that time.

Castelle: (408) 496-0474.

Framingham, Mass.-based **Microsystems Software, Inc.** last week unveiled Software Sentry, a **license metering** and network management tool that manages software application license usage on the network, as well as on individual user's local hard drives. The software utility maintains license data in dBase format, allowing net managers to manipulate the information and generate reports.

Start-up throws down price gauntlet in switching wars

BY SKIP MACASKILL

Atlanta

Start-up Amber Wave Systems, Inc. last week set a new pricing benchmark in the escalating Ethernet switch wars with a device that costs less than $200 per port.

The new switch, dubbed AmberSwitch, made its debut at the NetWorld+Interop 94 trade show here and grabbed some attention with pricing for a fully configured device that is comparable to standard 10Base-T Ethernet.

"An Ethernet switch for $175 per port is definitely a good price since it's practically the price of a standard 10Base-T port," said Tam Dell'oro, senior industry analyst at Dataquest, Inc., a market research firm in San Jose, Calif. "It's even better when you consider we're estimating the average street price of an Ethernet switch to be about $732 per port by the fourth quarter this year."

"An Ethernet switch for $175 per port is definitely a good price since it's practically the price of a standard 10Base-T port," Dell'oro said.

Competing switches range in price from less than $400 per port (Retix and Standard Microsystems Corp.) to more than $1,400 per port (Cisco Systems, Inc.).

Despite its start-up status, Amber Wave is no stranger to the switching game. Its two founders are former employees of Artel Communications Corp., an Ethernet switching pioneer that was acquired by Chipcom Corp.

AmberSwitch is a five-slot Ethernet switch that can support as many as four eight-port modules that provide dedicated pipes of 10M bit/sec to workgroup LANs and high-end workstations.

The switch, which can support more than 4,000 media access control addresses, features a 600M bit/sec backplane. Each module, which offers an aggregate packet-forwarding rate of 116,000 packet/sec, is powered by a Distributed Packet Processor that handles local switching on the card — only passing traffic to the backplane if it is destined for a different module.

AmberSwitch is a store-and-forward switch that supports the 802.1d Spanning Tree Algorithm bridging protocol and full-packet error checking.

The switch's fifth slot is reserved for a Simple Network Management Protocol-based systems management module that supports Amber's Super Core Address Manager software, which handles address resolution for the entire switch.

According to Curtis Gridley, president and cofounder of Amber Wave, a new module that supports 100Base-T fast Ethernet switching will be available by the end of the second quarter next year. Asynchronous Transfer Mode will be supported some time after that, he said.

amber wave
SYSTEMS

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AmberSwitch goes into beta testing in the fourth quarter with general availability scheduled for the first quarter of 1995. The price for an eight-port module, the chassis and one system management card is $1,995. The price drops to $175 per port in a fully configured, 32-port system.

"The average street price of these Ethernet switches will continue to fall, but that's not because vendors are dropping prices," Dell'oro said.

"It's due more to the fact that the lower priced boxes are the ones moving out the door and accounting for a majority of the switching market," he added.

©Amber: (508) 266-2852.

Vendors pair up for product debuts

Interop announcements include LAN and storage management solutions.

BY PEGGY WATT

Atlanta

A number of vendors with complementary products teamed up to show off LAN and storage management solutions at NetWorld+Interop here last week.

Among the announcements at the show were the following:

■ **Citrix Systems, Inc.** introduced TCP/IP for WinView, an add-on package that gives TCP/IP support to its WinView for Networks application server, along with an update to the WinView server software that provides Internet access and improved security.

With the TCP/IP for WinView option, remote as well as local users can access Windows, DOS and OS/2 applications on WinView servers. The TCP/IP technology, licensed from FTP Software, Inc., lets multiple users simultaneously dial into a WinView server to run applications using IPLink, a WinView client program that runs over TCP/IP.

The add-on works only with WinView for Networks Version 2.3, the update announced at NetWorld+Interop.

With the TCP/IP support supplied by the add-on, WinView for Networks 2.3 can serve as an Internet gateway. Because of the increased connectivity, its security system was boosted to a multilevel fire wall that includes encryption, restricts user access to other users' accounts and implements password protection. New remote security includes dialback and disconnect recovery to maintain and password-protect disconnected remote sessions.

WinView for Networks 2.3 is scheduled to ship at the end of this month and is priced at $2,995 for a 10-user system; more users can be added with the $695 Citrix Server Five Pack. Current WinView users can upgrade to version 2.3 for $395 through Dec. 31. TCP/IP for WinView is scheduled to ship in October, priced at $495.

Citrix: (305) 755-0559.

■ **Arcada Software, Inc.** showcased new LAN backup and storage solutions. The company, which said it will ship next month an updated Backup Exec for NetWare, also previewed Storage Migrator, a hierarchical storage management (HSM) solution for NetWare and Windows NT platforms.

Backup Exec for NetWare Enterprise Edition 5.01 applies a new agent accelerator design that enables the main server to hand off some backup responsibilities to remote servers. Because remote servers handle some of the file processing before backup, actual backup is faster, according to Arcada representatives. The update also provides a Windows NT agent, enabling backup of Windows NT workstations and servers across NetWare. It is priced at $1,295.

The new Storage Migrator uses InfiNET View to implement hierarchical storage management technology for assessing storage resources across the enterprise. The HSM moves the oldest data to less accessible media. The network manager can designate space availability, file migration times and file migration priorities. Availability and pricing were not announced.

Arcada: (800) 327-2232.

■ **Funk Software** announced WanderLink, a remote access product for NetWare. It incorporates standard security features, such as node identification, data encryption and domain filtering. However, once connected,

See Product debuts, *page 32*

Unlike some hardware system management software packages which only monitor your server, NetFinity™ 2.0 from IBM can also manage your clients. This powerful and easy to use software allows you to store and track system data; remotely detect, diagnose and solve system problems; and anticipate system requirements. Among other things.

And because NetFinity 2.0 works on DOS/Windows,® OS/2® and Novell® Netware,® and with network protocols like NetBIOS, TCP/IP and IPX, you can simply load it on to the LAN client system you already have.

Of course, since we also make some pretty nice hardware, we'd like to add that there's a way you can get even more out of NetFinity 2.0 – by pairing it with IBM PC servers and PS/2* clients. That way, you'll get the added protection of several IBM-exclusive feature enhancements that give you more systems management power.

Q. How can you manage a client/server system if you can only manage the server?

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To find out more about our latest PC servers, PS/2® clients or NetFinity 2.0, call your nearest dealer. To order NetFinity 2.0 call IBM PC Direct™ at 1 800 426-7098** or, for information by fax, call 1 800 IBM-4FAX and request document 2509. We'll be sure to fax it out right away.

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*marks of their respective holders. *NetFinity 2.0 supports 386SX or higher PCs and PS/2s. **In Canada, call 1 800 465-7999. PC Direct is a trademark of Ziff Davis Communications Company and is used by IBM under license. ©1994 IBM Cor*

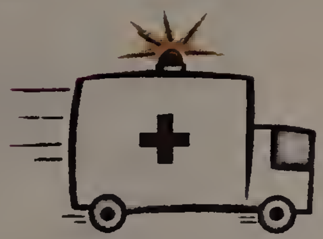
Remote System Manager
Relax. You're in control. Now you can remotely access and control all NetFinity 2.0 enabled systems.

Security Manager
NetFinity 2.0 lets you prevent that sneaky dog from gaining unauthorized access.

System Information Tool
What's up out there? NetFinity 2.0 gives you 20/20 vision to check memory, SCSI configurations, disk drives and practically everything else.

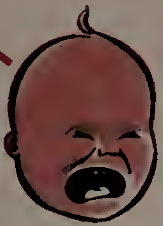
System Monitors
Uh oh. Major disaster about to happen with a system. NetFinity 2.0 lets you spot it before it blows up in your face.

IBM PC Server 95



Alert Manager
With NetFinity 2.0, you can receive and process application-generated alerts. You can specify almost any action in response to the alert, including being notified anywhere by beeper.

SNMP Alerting
You can't see everything. With NetFinity 2.0, maybe you can. It sends SNMP alerts from your PC to your LAN management system, such as IBM LAN NetView and NetView/6000.



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NET RESULTS

by Mark Gibbs

Sushi, soul and software

I just had dinner with my good friend Fred, and the time is now edging up to midnight.

In parallel with consuming a large quantity of sushi and a couple of Sapporos (extra dry), we got to talking about what's wrong in the world of corporations and computers.

After we dissected the PC and networking markets and the problems that organizations face, I started to think that a significant problem for corporations is that MIS will probably never be able to do its job.

Thud. Ah, the sound of masses of MIS folk hitting the floor in a dead faint. Or perhaps it is the sound of them planning to burn me in effigy (that's a town I'll avoid in the future). But, I digress.

The problem is inherent in the philosophy of corporate management, rather than the philosophy of MIS people.

The majority of corporations still operate on a centralized command-and-control basis — the historically validated model for running large enterprises.

In a command-and-control organization, you have a hierarchy of management. Messages get passed up and down the chain of command. This means that you start with policies at the top of the organizational tree that get filtered and translated into instructions as they are passed down to the people that actually perform work.

The workers do the work and create data that is passed back up the tree. This data is digested at each layer, and the top should recieve a filtered and condensed status report. The system is a loop that uses bureaucratic processes to handle data and transform it into information.

If you want to read an excellent paper on the topic of command-and-control organizations, check out "The Coming of the New Organization" by Professor Peter Drucker.

Command and control served well during the industrial revolution, but in the information age, it is a poor strategy. The main problem is that messages take a long time to travel up and down the layers of management. In today's markets, delay is not just inconvenient, it can spell failure.

Now if you look at most of the software that we use, the successful stuff is focused on personal productivity. I'm talking about word processing applications, spreadsheets, personal information managers and so on. These products are the ones that have defined and progressed the IT revolution in the vast majority of organizations.

On the other hand, the big centralized software packages that try to serve corporate or even workgroup needs (applications like Lotus Notes and most of the workflow packages) are very expensive to implement and maintain.

Why? Because they are based on the centralized command-and-control model of management. They require complex structuring and a great deal of planning and expertise to get them to do what they are intended for — to become the information soul of the corporation.

It is exactly that objective, the capturing of the corporation's soul, that MIS is being asked to do. It is supposed to deploy tools and systems that enable corporate goals.

But the tools don't exist! As good as Lotus Notes and some other tools are, the fact is that the top-end tools (or at least those we have today) have not been as much of a success in improving corporate productivity as PC-based word processing, spreadsheets and so on.

Centralized tools, like centralized corporate management, just don't work on the large scale when the key to operation is speed.

Thus, I think that unless there is some kind of phenomenal paradigm shift (damn, I swore that I'd never use that phrase in print) in groupware, MIS is being forced to do the impossible: make the command-and-control organization workable.

What we need to do is either improve software or have MIS concentrate on enabling personal productivity. The latter is the only choice at the moment.

Ah well, time for sleep: perchance to dream of sushi. Good night.

➾ Mark Gibbs is a consultant and writer based in Ventura, Calif. He can be reached at (800) 622-1108, Ext. 504, or on the Internet at mgibbs@rain.org.

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Windows Connectivity Forum

A new resource for Windows networkers

Welcome to the first Windows Connectivity Forum column, which is aimed at helping readers make decisions on products, development and support issues that affect Windows connectivity.

We've been dealing with these issues for more than 5 years, and our experience is recorded in our newsletter "The Windows Journal." The Windows Users Group Network has flourished on CompuServe by promoting the exchange of technical information and solutions among Windows users since its inception in 1988.

The column complements the new Windows Connectivity (WINCON) Forum on CompuServe, which is sponsored by *Network World.*

The forum is designed to promote user-to-user and vendor-to-user exchanges of technical information about all aspects of Windows Connectivity.

Our staff has logged thousands of hours in Windows support and can now help you deal with everyday Windows network issues surrounding groupware, E-mail, wide-area network application design and support, network maintenance and optimization, compatibility and network troubleshooting.

Our sysops will also feature the coauthors of our new books, *Windows 3.1 Connectivity Secrets* and *Window 3.1 Configuration Secrets* (IDG Books Worldwide). A staff of technical associates and specialists will offer their insights on interfacing NetWare to Windows for WorkGroups 3.11 and hundreds of other real-world connections.

Here's what else you'll find:

■ WINCON will provide 24-hour, direct access to technical and product representatives from Artisoft, Inc., Microsoft, Novell, Inc., OTC Corp., Spry, Inc. and others. You'll be able to find the latest network drivers, udpates and technical notes.

■ *Network World*'s NetAccess demo library (currently available via BBS) will also be available with active messaging support in a dedicated library.

■ A special section on WINCON will feature the latest and greatest on Windows communication packages and third-party add-ons for optimizing your support and communications to the CompuServe Information Service. Our library will feature the latest tools and enhancements to integrate your network and desktop applications to CompuServe's virtual technical resources.

■ Windows Internet Support, the largest library of updated Windows Internet software, tools and add-ons, from PipeLine 2.0, WinMail, PC Eudora, Trumpet and hundreds of WinSock 1.1 standard applets. Each month, we'll host an Internet software vendor as a special guest, with an opportunity to try its new software available from the data library.

■ The data library will maintain the most extensive collection of third-party scripts and add-ons for dozens of commercial products, such as ProComm Plus, Crosstalk, Dynacom and WinComm Pro. Need help writing a script or taking advantage of an advanced feature in a modem? The on-line staff will point you to the experts or the area of CIS where you can find the solution.

■ The data library will also contain an archive of press releases, technical notes and resources covering all aspects of Windows connectivity, including paging, remote access, remote control, compatibility reports, archived message threads and white papers on Chicago, Windows NT 3.5, Hermes, Microsoft Exchange, Lotus Notes, Novell NetWare, Banyan VINES and hundreds of others.

WINCON's mission is to provide you with information that helps you maximize your Windows networks and applications.

That's also the idea behind this column, which each week will alert you to new features on WINCON and explore the issues being discussed and debated on the forum. We'll also keep you up-to-date on new Windows net technologies and customer concerns.

By Joel Diamond
Technical director
WUGNET
Windows User Group Network
76702.1023@CompuServe.com

To get to Windows Connectivity Forum, **CompuServe**
type Go Wincon at any ! prompt on CompuServe. If you are not currently a member of CompuServe, *Network World* and WUGNET are offering a free membership signup by calling (800) 524-3388. Ask for operator 426.

Product debuts

Continued from page 27

WanderLink becomes a network node and can access file servers, E-mail and printers, or even remotely operate a personal computer on the LAN.

The product is scheduled to ship next month. It is priced per port, beginning at $295 for the first port and $100 for each additional one.

Funk Software: (617) 497-6339.

■ **Pacific Data Products** announced Pacific DirectNet PS, a print server for NetWare, and enhanced its Pacific DirectNet EX and Pacific DirectNet IN print servers for use in token ring networks with newly added AppleTalk support.

Pacific DirectNet PS lets any parallel printer connect directly to a NetWare net. It is available now for $349.

Macintosh users can now take advantage of the enhanced Pacific DirectNet products. Pacific DirectNet EX, which is priced at $549, supports Ethernet networks running IPX/SPX and TCP/IP. DirectNet IN for token ring is an internal card for PCs that gives network clients direct, simultaneous access to Hewlett-Packard Co. LaserJet printers. It costs $599.

Pacific Data: (800) 737-7121.

■ **MiraLink Corp.** introduced Off-SiteServer, which can mirror a LAN's file server data to a remote site in real time.

The product provides standard disk mirroring under Novell, Inc. NetWare and works with Vinca Corp.'s Standby Server card to send data across a communications link to a remote server. Off-Site Server includes a smart buffer to accommodate disk I/O.

The hardware/software device, which is rack-mountable, includes a 500M-byte buffer, four Inmos T225 16-bit transputers, each with 64K bytes of random-access memory, power supply and two RJ-45 connectors. The product is scheduled to ship next month and is priced at $19,950 for a pair.

MiraLink: (801) 221-1862.

■ **Intrak, Inc.** released ServerTrak for Windows, an integrated NetWare performance management tool.

The server component monitors more than 45 network performance statistics and ratios, while the workstation component processes, records and displays the information on any Windows client. The performance monitor runs on NetWare 3.X or 4.X.

ServerTrak for Windows is available as a single-server, five-server or 10-server package. Through the end of the year, introductory prices are $199 for one server, $599 for five servers and $799 for 10 servers.

Intrak: (800) 233-7494.

SPARC-BASED SERVERS

Sun eyes PC LAN mart

BY PEGGY WATT

Mountain View, Calif.

Sun Microsystems Computer Co. (SMCC) last week made a foray into the PC LAN market, introducing a line of SPARC-based servers preconfigured with Solaris and SolarNet software and offering a ready-made link to the Internet.

The Netra line is being launched with a server that provides Internet access and a System Management Server for LAN administration. Both are scheduled to ship in the fourth quarter as the first members of a family of application-specific servers that will eventually include database and groupware servers, for example.

The new boxes will duck direct competition with Sun Microsystems, Inc.'s five-year-old SPARCstation line by being sold primarily through different channels, specifically by value-added resellers and independent software vendors, said Maneesh Dhir, Sun's senior product manager for server product marketing. Merisel, Inc. of El Segundo, Calif., signed on as the first distributor of the new line.

Sun's Netra PC LAN servers

Internet Server
- MicroSPARC-II CPU
- Up to 256M bytes of RAM
- Up to 2G bytes of internal disk
- Up to 29G bytes of external disk
- 3 Sbus I/O slots
- CD-ROM and floppy drives
- Supports Ethernet, SCSI, TPE, and parallel and serial ports

System Management Serv
- Up to 4 SuperSPARC CPUs
- Up to 512M bytes of RAM
- Up to 2G bytes of internal disk
- Up to 37G bytes of external disk
- 4 Sbus I/O slots
- CD-ROM and floppy drives
- Supports Ethernet, SCSI, TPE, and parallel and serial ports

Sun wants a share of the growing application server market, which is estimated in a recent International Data Corp. (IDC) study to be 27% of LAN server sales today but is projected to hit 40% of server sales by 1997. Also, IDC estimates that TCP/IP LAN installations are growing 52% yearly.

Users and analysts suggest the new line will appeal mostly to existing SMCC sites already running the Solaris and SolarNet software.

"Sun's got an uphill battle," said Greg Scott, information services manager at the College of Business at Oregon State University in Corvallis, Ore. "Intel has such a market share, somebody has to show me a compelling reason why I should change."

Sun will also have to change its reputation with resellers, said Jamie Lewis, executive vice president of information services for The Burton Group in Slat Lake City. "Sun is always going to be viewed first by resellers as a company that prefers to sell direct."

The Netra Internet Server is a ripe, new opportunity, said Michael Howard, president of Infonetics Research, Inc. in San Jose, Calif. "But these aren't really PCs; they're Unix servers with a SPARC chip."

The server includes the Mosaic graphical interface, a mail gateway from the SolarNet network operating system to the Internet, and Telnet support.

At NetWorld+Interop 94 in Atlanta last week, SMCC also announced alliances with NETCOM On-line Communications Services, Inc. of San Jose and Sprint Corp. that will give Netra Internet Server users discounts of an unspecified amount on the two carriers' respective Internet access services. Sprint offers the SprintLink Internet access service.

The Netra System Management Server, meanwhile, will come preloaded with SMCC's existing SolarNet personal computer LAN administration software. That will make the server attractive for use on mixed PC and workstation LANs, such as the 800-node network at Auburn University's College of Engineering in Auburn, Ala.

"It makes PC administration a breeze," said Ray Hiltbrand, network administrator at the school, who tested SolarNet when it first shipped.

Both members of the Netra line come with SunSoft, Inc.'s Solaris 2.3 Unix-based operating system preinstalled and support Intel-based PCs, Macintoshes and Unix workstations. The servers coexist with NetWare, Windows for Workgroups and LAN Server via TCP/IP.

A security package, FireWall-1 from Checkpoint Software, also is bundled with both members of the Netra line, extending server security to clients on the LAN.

Both Netra servers also support floppy and CD-ROM drives, with Ethernet, Small Computer System Interface, TPE, parallel and serial ports. The Netra Internet Server is powered by a MicroSPARC-II CPU, while the Netra System Management Server can support as many as four SuperSPARC CPUs.

Each of the Netra servers is available in two configurations. The Netra Internet Server's base configuration includes 16M bytes of random-access memory and a 535M-byte hard disk drive, and costs $6,149; a server with 32M bytes of RAM and 1.05G bytes of storage costs $8,499.

The Netra System Management Server comes standard with 32M bytes of RAM and a 1.05G-byte hard drive; the base system costs $10,399, and a version with four processors costs $18,299.

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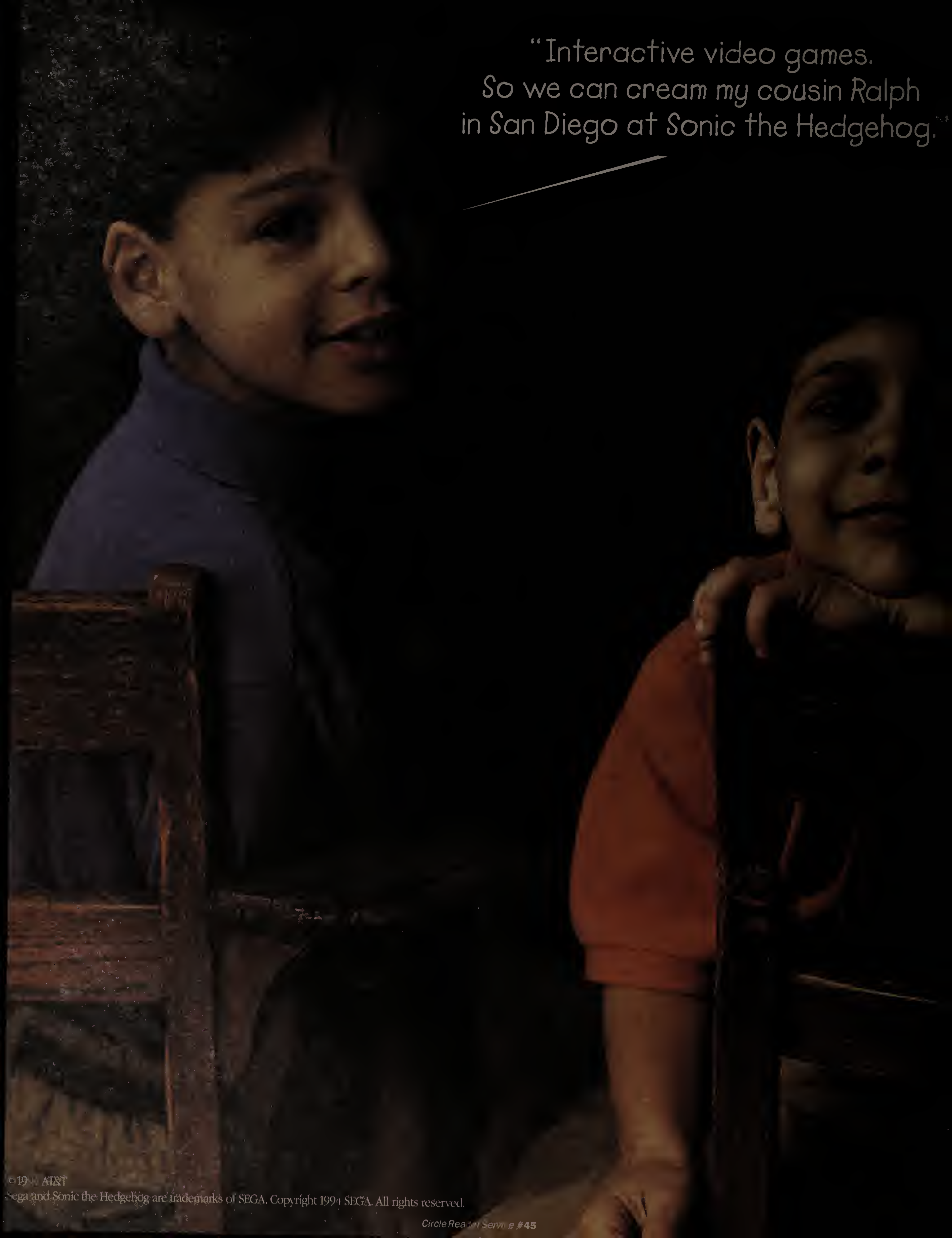
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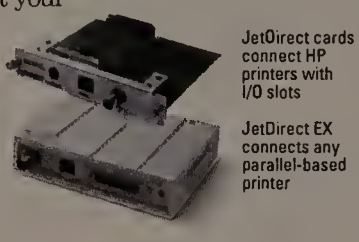

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MCI unveils integrated access pack

Windows software gives users access to faxes, E-mail, Internet, other on-line services.

BY BILL BURCH

Atlanta

MCI Communications Corp. last week announced a Windows-based software package that integrates access to the carrier's fax, E-mail, Internet and other on-line services.

With the carrier's NetworkMCI Business software and services, users will be able to do such things as receive a fax, edit it, then send it to others via E-mail. Other features include document sharing, a catalog shopping service and an information service that offers twice-daily news summaries, allowing users to monitor developments in selected industries.

All the services will be available with the package's release next month, except for Internet access, which will be launch by the end of the year with a Mosaic-like graphical user interface. In coming months, MCI is preparing to make a series of Internet announcements, possibly including electronic commerce offerings, according to Richard Ellenberger, an MCI senior vice president.

MCI plans to charge $100 for the Windows software package and $65 per month for its on-line information service. For E-mail and fax service – provided via E-mailMCI and FaxMCI, respectively – users must pay the usual charges associated with these types of offerings. The carrier is offering selected business customers special rates for the services.

The carrier also is offering a separate deal on desktop videoconferencing equipment. Users can lease PictureTel Corp. gear for $110 per month with a three-year commitment, an excellent price, according to Christine Heckart, a senior analyst with TeleChoice, Inc. in Verona, N.J.

MCI's software package borrows extensively from existing technology. The carrier will be reselling fax software from Delrina Corp., E-mail software from ConnectSoft and analog collaboration software from DataBeam Corp. The information services will come from a feed from Equifax, Inc., while the catalog software will be based on imaging technology from Image Technology, Inc. in Research Triangle Park, N.C.

"This is long overdue," said Dick Bradner, manager of network and office services for Progressive Insurance Co. in Cleveland. "They've brought it all together."

See **Access pack**, *page 42*

Ameritech unit emphasizes flexibility in its ATM rollout

BY DAVID ROHDE

Atlanta

Ameritech Corp. last week launched its commercial Asynchronous Transfer Mode service with almost an infinite variety of service configurations.

Key to the announcement at the NetWorld+Interop show here was a list of vendors from which an unregulated division of Ameritech will buy ATM carrier and premises switches, frame-to-cell interworking switches and ATM data service units (DSU).

By mixing and matching equipment platforms, Ameritech Advanced Data Services is allowing customers to choose where cell switching begins, depending on their traffic and comfort level with ATM migration.

Customers will be able pass frame relay traffic to the carrier's ATM network, run both local- and wide-area ATM backbones, and take ATM right to the desktop.

For customers who want ATM connectivity but lack the bandwidth requirements to justify their own ATM switch, Ameritech is offering a range of service multiplexers, ATM DSUs and ATM-compliant routers (see graphic).

Technically, Ameritech Advanced Data Services will purchase transport facilities from its parent regional Bell holding company to provide WAN service.

Buying transport this way results in Ameritech's unique distance-sensitive ATM pricing (*NW*, Sept. 12, page 4) because it is passing on costs from the parent company's mileage-based tariffs, Ameritech officials said.

"We could even buy transport from another company besides Ameritech," said Tom Snyder, manager of program development for Ameritech Advanced Data Services.

The monthly price to the customer will include ATM service, equipment, maintenance and monitoring. In a reversal of the typical carrier approach to managed networks, the basic structure of the service assumes carrier management, with an option for customers to monitor the logical termination points on their user network interfaces if they wish.

The carrier equipment will be placed on Synchronous Optical Network (SONET) rings, and – in line with offering the service through an unregulated subsidiary – actually will be installed outside regular Ameritech central offices (CO), Snyder said.

Placement in regular COs could result in service requests from customers with locations outside the area served by the CO with the ATM switch-

See **Ameritech**, *page 41*

Vendors for every ATM need

Carrier equipment
◆ AT&T: Globeview 2000; BNS 2000
◆ GDC: APEX
◆ Cascade: B-STDX 9000; STDX 6000 and STDX 3000

Premises equipment
◆ GDC: APEX DV2 and APEX-MAC
◆ Cisco: 7000 and 4500 routers
◆ ADC Kentrox and Digital Link: ATM DSUs and multiplexers

PUBLIC SERVICES

Infonet launches Internet division, frame relay service

BY ELIZABETH HEICHLER

London

Infonet Services Corp. last week launched a new division that will provide commercial Internet services to corporate customers and announced support for frame relay access to its range of InfoLAN services.

Infonet will also announce a new range of very small aperture terminal satellite services in the next few weeks, said Ian Widger, vice president of product marketing for the firm.

The new INFO.Net division will provide secure access to the Internet, even where IP services are not locally available. The offering will be available in January in the U.S., with other countries to be announced. It will include both dial-up and dedicated Internet access at speeds ranging from 2,400 to 56K/64K bit/sec.

"We will bring a truly commercial Internet to bear," Widger said. "It's important when we work with customers that we provide fluency of access without exposing their business."

Infonet will provide that security via fire walls that isolate corporate nets from unauthorized intruders, while still providing services such as E-mail, according to Infonet. Services and applications offered by Infonet will include Domain Name Services, World-Wide Web (WWW), Wide Area Information Services, Gopher, telnet and File Transfer Protocol.

Customers who have access only to X.25 services rather than IP will be able to access the Internet via INFO.Net hosts and will still be able to use the whole range of services, according to the company.

INFO.Net will also be available as a complete service to incountry operators that want to offer local

See **Infonet**, *page 42*

BRIEFS

The **Florida Public Service Commission** opened up hearings last week on **dialing parity** for the state's intra-local access and transport area toll traffic. Currently, Florida residents must dial a five-digit carrier access code if they want to use a long-distance carrier for that traffic. The hearings will consider establishing 1+ dialing for access to long-distance carriers.

In New Jersey, **AT&T** this month cut its intra-local access and transport area toll rates in an attempt to steal small business away from **Bell Atlantic Corp.** Price cuts and volume discounts will let users save 20% over Bell Atlantic rates, AT&T said. **New Jersey** launched intra-LATA toll competition on July 1.

Singapore Telecom last week announced that its telephone network is now **completely digital.** The network's high-speed lines can support videoconferencing, while an advanced switching platform allows the creation of such services as collect call screening. Future services will include outgoing call screening. With digitization complete, the carrier is now investing in expanding its broadband net for voice, video and data traffic. Commercial broadband services are scheduled for introduction in 1997.

WilTel is expanding its **frame relay** coverage to metropolitan areas in **Canada** and along the **Pacific Rim.** The carrier installed a switch in Toronto in August and will place switches in Hong Kong and Tokyo in the fourth quarter. The company already has frame relay service in Europe.

MFS Communications Company, Inc. last week completed a **fiber network** in Wilmington, Del. The company plans to extend the network to business centers in the city's northern and southern suburbs.

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*Circle Reader Service #***54**

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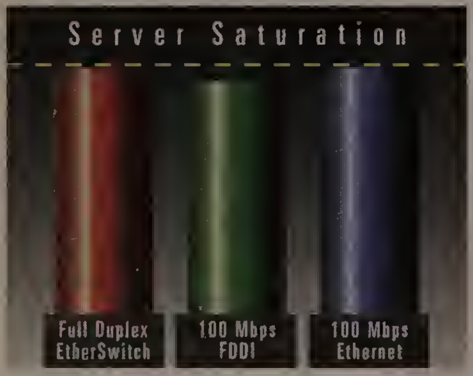

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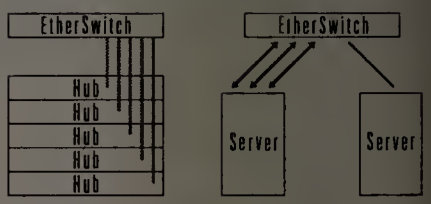

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Insurance and legal issues hobble telemedicine growth

BY DAVID ROHDE

Washington, D.C.

Several major hurdles face the field of telemedicine before long-distance diagnosis and treatment become widespread, according to speakers at a recent Information Superhighway conference here.

At the center of the problem is the cost of equipment and line charges required to transmit X-rays, stethoscope readings and other data live to a remote location, medical professionals said at the meeting, sponsored by the Council on Competitiveness and the Information Infrastructure Task Force.

As a result, telemedicine projects — often showcased as the social welfare centerpiece of the Information Superhighway — have yet to draw support from insurance providers.

"Medicare doesn't pay for consultation [using] telemedicine and doesn't appear likely to do so in the near term," said Dr. Helen Smits, deputy administrator of the Health Care Financing Administration. "And I have yet to find a managed care system making use of it.

Doctors' five big concerns about telemedicine

1. Insurance coverage does not exist.
2. May require out-of-state licenses.
3. Equipment and lines are expensive.
4. Privacy could be compromised.
5. Established doctor-to-doctor relationships could be upset.

"The most mature system I know of is in western Texas," she said. "The primary care physicians use it once a week, [and it's hard to justify the cost of the lines] for 50 consultations per year per doctor."

Lack of an assured payback is forcing compromises elsewhere, as well. A rural telemedicine pilot conducted by the University of South Carolina and supported by BellSouth Corp. and GTE Telephone Operations had to settle for a 384K bit/sec link rather than the broadband link they would have desired, said Dr. Stanley Fowler, associate dean of the university's medical school.

The doctors in the South Carolina project are concerned not only about the recognition by insurance outlets, but also malpractice, Fowler said. "Telemedicine remains yet to be accepted by the medical societies as a proper standard of medical care," he said. As a result, doctors "may be vulnerable to lawsuits and malpractice."

Doctors are also concerned that if they are not licensed to practice a specialty in a distant state where the patient is located, they may be considered to be practicing illegally, said Dr. Michael Ward, a consultant in orthopedic surgery at the Mayo Clinic.

For example, the Kansas state legislature in June passed a law stating that the physicians must have a Kansas license if they practice medicine on a Kansas resident, regardless of how the consultation and treatment takes place, Ward said. The state of Maine is considering similar legislation, he added.

The conference here — appropriately titled Breaking the Barriers to the National Information Infrastructure — also brought out more familiar refrains about telemedicine.

The medical professionals said they have found some resistance to the concept of telemedicine among doctors and many concerns among patients about privacy issues. Z

Comments?

See "Contacts" box on page 2.

Ameritech

Continued from page 37

ing capability, Snyder said. By contrast, setting up a separate net through Advanced Data Services gives the carrier more flexibility to place the switches according to customer demand.

Ameritech officials unabashedly said these moves help position the carrier to expand its service if it gains the right to cross local access and transport area boundaries.

"It's going to position us to put many more switches in," Snyder said.

Ameritech's strategy of providing the offering through an unregulated subsidiary — which applies to all its fast-packet services — gained the endorsement of Joe Mambretti, director of the office of strategic technologies at the University of Chicago. The university uses Ameritech's newly rechristened Connectionless Broadband Data Service, the carrier's version of Switched Multimegabit Data Service.

Mambretti told a meeting last week of the SMDS Interest Group that "there's been a sea change" in the attitude of carriers, particularly Ameritech, in partnering with users on data networks. Z

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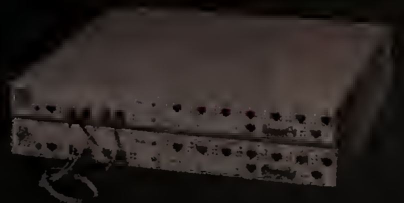

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Circle Reader Service #51

Access pack

Continued from page 37

Progressive already has a fax server and runs Lotus Development Corp.'s Notes for its internal E-mail. But Bradner said he would consider NetworkMCI Business for external E-mail because of the service's wide connectivity, low-entry fees and relatively inexpensive messaging.

The company also might use MCI for Internet service, Bradner said. The company would like to set up a Gopher site but worries about security and big file transfers degrading overall network performance. An outside provider would solve both problems, he added.

Jeff Leopold, director of client/server computing research with Gartner Group, Inc., said integrating E-mail, fax and Internet capabilities in a single Windows package is a good idea but the on-line information service is less appealing. He noted that subscribers to America Online and other services use predominantly just messaging capabilities, skipping over on-line information services for the most part.

As for document sharing — where multiple users can view the same document and each can make changes — most users have only made it as far as pilot studies, Leopold said. But he thinks businesses will eventually be drawn to the service.

"This is technology that enables a virtual corporation," he said. "There is absolutely a real need for it."

Unlike Intel Corp.'s ProShare, MCI settled on standards-based document sharing by supporting the proposed T.120 standard. That's a smart move, Leopold said, and it will allow users to communicate across various companies.

NetworkMCI system requirements

- 386 PC or higher
- Windows 3.1 or higher
- 9.6K bit/sec fax modem
- 20M bytes of hard disk space
- 4M bytes of RAM
- Analog telephone line

Note: Videoconferencing imposes additional system requirements.

The carrier's on-line catalog puts it in the company of Advantis, GE Information Services and other value-added providers.

MCI's edge will be its installed base of 700,000-plus MCI Mail users, as well as its nationwide marketing organization, said analyst Torrey Byles, associate director of electronic commerce strategies for BIS Strategic Decisions in Santa Clara, Calif. ◼

Infonet

Continued from page 37

Internet distribution and access services.

Infonet user Tom Holt, executive director of MIS at Informix Software, Inc. in Menlo Park, Calif., is experimenting with electronic delivery of its products and is using the WWW for frequently asked questions and support.

"We believe we've only just seen the surface of what's going to happen with the Internet," said Mark Winther, vice president for worldwide telecommunications at LINK Resources Corp., a market research firm in New York. "To really benefit from it, companies are going to need a lot of help. They will need tools, not just connectivity and access — they need security, protection from bugs and viruses on the Internet. Infonet should look at ways to capitalize on these requirements."

"We believe we've only just seen the surface of what's going to happen with the Internet," said Mark Winther.

On the frame relay front, Infonet is scheduling general availability of InfoLAN FR service for Oct. 1 at the end of a six-month beta test, and it will be available in Australia, Canada, Europe, Hong Kong, Singapore, Taiwan and the U.S.

InfoLAN FR will offer access speeds ranging from 9.6K bit/sec to T-1/E-1 and will support protocols including TCP/IP, Novell, Inc. IPX, Systems Network Architecture, Network Basic I/O System, DECnet, Open Systems Interconnection, AppleTalk, Xerox Network Systems, VINES IP and X.25. Customers will be able to choose star or mesh network topologies, or a combination of the two.

Customers of the InfoLAN FR service will be able to use the frame relay routers they already have, according to Infonet, or they can use Cisco Systems, Inc. routers provided, configured and maintained by Infonet.

For the soon-to-be-announced VSAT services, Infonet will contract directly with the main satellite vendors to offer a wide range of access. It will initially offer X.25 over satellite and then IP and frame relay, Widger said.

The service will feature shorter term contracts than some competitors — one year vs. three years — and there will be no requirement for customers to buy equipment because Infonet will own, license and maintain it.

➾ Heichler is a European correspondent at IDG News Service.

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RATE & TARIFF MONITOR

by Eric Paulak

AT&T: The small business carrier?

Ever since divestiture, AT&T's been known for catering its services to corporate America. And that, for the most part, has worked fairly well.

But it hasn't worked well in the small and midsize business market. Since 1984, AT&T's overall market share has eroded from more than 90% to around the 60% mark, with much of the loss coming in the small business arena.

AT&T is now trying to stem that tide and pull in some of the small businesses that have been lured away by MCI, Sprint and the hordes of second-tier carriers and AT&T resellers. And it's playing hardball to do it.

AT&T's first volleys back into the small business market came in March and April, when it introduced its CustomNet Option S contract tariffs (*NW*, May 23, page 35).

AT&T was offering discounts of up to 36.95% for a commitment of only $200 per month. That equated to outbound rates of $.164 per minute and inbound prices of $.173 per minute.

But contract tariffs are only open to the public for 90 days after they are signed by the first customer, which means AT&T has to keep reissuing the contract deals to keep them current. And some customers are excluded if they don't meet the requirements of the original deal, like having a minimum number of locations.

As a result, instead of making you sign a contract tariff to get the great deal, AT&T is now offering Option S as several promotions (Promotions 653 and 654) that just about anyone can qualify for. Here's how it works:

Commit to $200 per month in inbound and outbound traffic for one year by Jan. 1, and AT&T will give you 25% off of the tariffed rates of $.261 per minute for outbound and $.276 per minute for 800 calls. That's on top of the 3% for outbound and 6% for inbound discounts that are already part of standard one-year Option S service.

The 3% and 6% discounts are taken after the 25% discount, so you end up with a total discount of 27.25% for outbound and 29.5% for inbound. This all translates into $.1899 for outbound and $.1946 for inbound for one year.

Commit to $500 per month for a year, and AT&T will give you a 30% discount on top of the 3% and 6% standard one-year discounts. That's an overall savings of 32.1% and 34.2%, or rates of $.1772 and $.1816, respectively.

The promotional savings by themselves don't match what you can get with a contract tariff, but you also don't have to negotiate a deal, and they're so open-ended that just about anyone can get them.

To sweeten the promotions even more, AT&T is waiving all installation fees for as many as 10 CustomNet locations — that's an extra 100 bucks total, or half a month's commitment level.

Why this new focus on small businesses? AT&T says it's not new, that the company's always concentrated on all segments of the market. But MCI and LDDS Communications, Inc. sales representatives say it is a new focus, the proof being that they now have to compete with AT&T on price, whereas previously AT&T was always higher.

And AT&T resellers say it's an effort by AT&T to drive them out of business.

The truth is that AT&T is taking a harder look at the small business market because its time has come.

Last year, 800 portability forced AT&T to worry about its large customers, thanks to the Fresh Look clause that allowed AT&T's Tariff 12 customers — AT&T's biggest users — to get out of their contracts and switch carriers without a penalty.

With the threat from Fresh Look gone, it's the small business market that's now up to bat. As a result, great deals are out there from all carriers — first, second or whatever tier. You just have to look for them and insist that your sales representatives give you everything that you're eligible for.

➻ Paulak is associate publisher for the Center for Communications Management Information, a provider of rate and tariff information in Rockville, Md. He can be reached at (301) 816-8950, Ext. 327.

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When you're ready to add bandwidth to your corporate backbone, the Enterprise Hub's ATM backplane will give you an ATM superhighway. Which means legacy LANs can be married to high-performance ATM backbones. And later, when you're ready to bring ATM capabilities like multimedia to the desktop, it's as easy as adding a card to the Enterprise Hub's cell-based backplane.

In addition, the Enterprise Hub's ATM backplane allows you to add, segment, and define virtual LANs, on the fly, right from your network management station.

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SLOTS/ SEGMENTS	14/168	17/100	14/52	14/112
MAX. PORT DENSITY	500	200	240	336
TOPOLOGIES	Ethernet, Token Ring, FDDI, ATM	Ethernet, Token Ring, FDDI, ATM	Ethernet, Token Ring, FDDI	Ethernet, Token Ring, FDDI, ATM
ROUTING	IP, IPX, DECnet, Appletalk	No Routing	No Routing	IP, IPX, DECnet Phase IV, AppleTalk, XNS, OSI, X.25, RIP, OSPF, BGP, ES-IS, IS-IS, Transparent Bridging and Source Route Bridging
STARTING PRICE*	$417/port	$200/port	$223/port	$160/port

*Pricing and other chart information was compiled from multiple industry resources as of 3/94

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CLIENT/SERVER APPLICATIONS

Distributed Databases, Messaging, Groupware, Imaging and Multimedia

REGIONAL DBMS

Progress prepares new database, tool versions

BY BARB COLE

Bedford, Mass.

Progress Software Corp. this week will announce new versions of its database and front-end tool that have improved cross-platform support and more object-oriented programming features, the company said.

With Progress 7.3, which includes the Progress relational database management system, Progress Application Development Environment (ADE) and middleware, developers can build applications for Windows, for example, and deploy it on Motif or DOS without rewriting, according to Progress.

In addition, ADE lets developers design code templates that may be reused in multiple applications. The company said these templates can be built independently but will work together.

"Sometimes objects are tied to certain data and require recoding when you try to use them," said Bill Phelen, product manager at Progress. "That's not the case here."

ADE comes with a number of predefined code templates, such as those for scrolling through records and exiting, that may be dragged and dropped into applications.

With ADE, users can write client applications that access a number of databases, including Oracle Corp. Oracle7 and Rdb, Sybase, Inc. System 10, and IBM OS/400 and DB2.

Version 7.3 will let developers map different code

See Progress, page 49

Reality ☑ Check

Product: Progress Version 7.3
Company: Progress Software Corp.

The benefits:

- Includes database server, front-end tool and middleware.
- Can be used to build applications for DOS, Windows or Motif.
- Can access multiple back-end databases from front-end applications.

The drawback:

- Server product lacks features like replication and support for parallel processing machines.

The user view:

"The reusable code templates have saved us about 10% off our normal development time."

Chuck Boynkin, database administrator, Western Merchandisers, Inc.

Consolidation fuels apps development tool evolution

BY BARB COLE
AND KEVIN FOGARTY

Time was, you could anticipate a new client/server development tool hitting the streets every week. But new product introductions have slowed, marginal players are being swallowed by more successful ones, and front-end vendors are scrambling to enrich their products to meet customer demands for more robust tools.

It's no longer a question of simply having a slick graphical user interface and a programming language. Users say most client/server tools also need to be scalable and secure enough to support enterprise applications.

INCREASING SUPPORT

Toward that end, front-end tool vendors such as Gupta Corp. and Powersoft Corp. said they will enhance their products during the next few years to support advanced features such as partitioning, and let users build faster applications and do object-oriented programming.

What's more, vendors are looking at ways to enable application developers to share objects designed with one tool with other front-end tools.

The front-end tool market has already started shaking out (see graphic), but analysts said more buyouts are likely to occur during the next year as the market matures. Since some tool companies will not have the resources to evolve their products to the next level, users will likely be choosing development tools from companies such as IBM, Microsoft Corp. and Novell, Inc., the major database vendors, and a handful of more successful tool providers, analysts said.

"We're seeing the pace of growth slow, and we're seeing who will last and who will not," said Wayne

See Evolution, page 50

Front-end fallout

Recent consolidation in the client/server development tool market.

April

- Compuware Corp. buys front-end toolmaker Uniface Corp.
- Intersolv, Inc. acquires Q+E Software, Inc., maker of query tools and ODBC drivers.

May

- Query and reporting tool company Crystal Services is absorbed into Seagate Technology.

June

- Oracle buys 8% of Gupta Corp. and considers acquiring the entire company to gain access to its SQLWindows front-end tool.
- Dun & Bradstreet Software acquires Pilot Software, Inc., maker of on-line analytic processing systems.

July

- Oracle calls off merger talks with Gupta.

August

- Sterling Software, Inc. acquires Knowledgeware, Inc., maker of the ObjectVision front-end tool.
- Texas Instruments, Inc. says it will publish APIs that will let other vendors' tools work with TI's Information Engineering Facility application builder.

BRIEFS

Enterprise Solutions, Ltd. in Westlake Village, Calif., unveiled at NetWorld+Interop 94 a set of **electronic mail** and messaging products designed to let customers develop a single X.400/X.500-compliant backbone for use by LANs and WANs. The Enterprise Xtended Mail products include a server-based Message Store, a security module that provides password security, as well as encryption, digital signatures and authentication. They will ship in early October for about $1,000 per server and $50 per client. They run with Microsoft Corp.'s Windows, DOS, Apple Computer, Inc.'s Macintosh, Motif and a range of Unix flavors.

Enterprise Solutions: (805) 449-4181.

Microsoft Corp. and **Btrieve Technologies, Inc. last week said that they will jointly market the Btrieve database** engine for Windows NT. Under the agreement, Microsoft will include a coupon in each package of Windows NT Server that can be redeemed for a 10-user version of the client/server Btrieve database engine for Windows NT for a promotional price of $99. After one year, the firms will offer a package of Windows NT Server and Btrieve.

Microsoft: (206) 882-8080.

Compaq Computer Corp. last week said it would sell servers with database software on-board. Compaq will offer Oracle Corp. Oracle7 Version 7.1 Enterprise Server and Microsoft Corp. SQL Server databases on a CD-ROM from which customers can load software. The Compaq ProLiant 2000 5/90 costs $11,600 and will be available by the end of this month. The ProLiant 4000 5/100, which costs $17,500, will be available in the fourth quarter. The databases, which will cost extra, will be available by the fourth quarter.

Compaq: (713) 370-0670.

Intersolv ports ODBC drivers to Mac

BARB COLE

Rockville, Md.

Intersolv, Inc. last week said its Open Database Connectivity (ODBC) drivers are now available for the Macintosh and that Informix Software, Inc. licensed its ODBC technology for inclusion in front-end development tools.

Using Intersolv's DataDirect Developer's Toolkit (formerly known as Q+E Software, Inc.'s Database Library), DataDirect ODBC Pack and DataDirect ODBC Drivers, Macintosh users will now have access to 10 ODBC-compliant personal computer databases, including Microsoft Corp. SQL Server, Oracle Corp. Oracle7 and Sybase, Inc. SQL Server.

The Intersolv products are the first implementation of ODBC on the Macintosh. Microsoft, developer of the ODBC specification, plans to release an ODBC software development kit for Macintosh this year.

Analysts said the availability of ODBC drivers for the Macintosh would make it easier for systems administrators to integrate Macintoshes into enterprise networks.

"Those who use the Mac will now have a standardized interface into Intel [Corp.] back-end databases," said Ed Ackly, an analyst at International Data Corp. in Framingham, Mass. "It makes the access a lot more transparent for Mac users."

All Intersolv products for Macintosh are available now. The DataDirect ODBC Pack costs $499 per user for all databases. ODBC drivers for individual databases cost $99 per user. The DataDirect Developer's Toolkit is priced at $699 per user for each operating system and includes a single license for the DataDirect ODBC Pack.

In a separate announcement, Intersolv said Informix has licensed the DataDirect ODBC Drivers and will include them in its development tools.

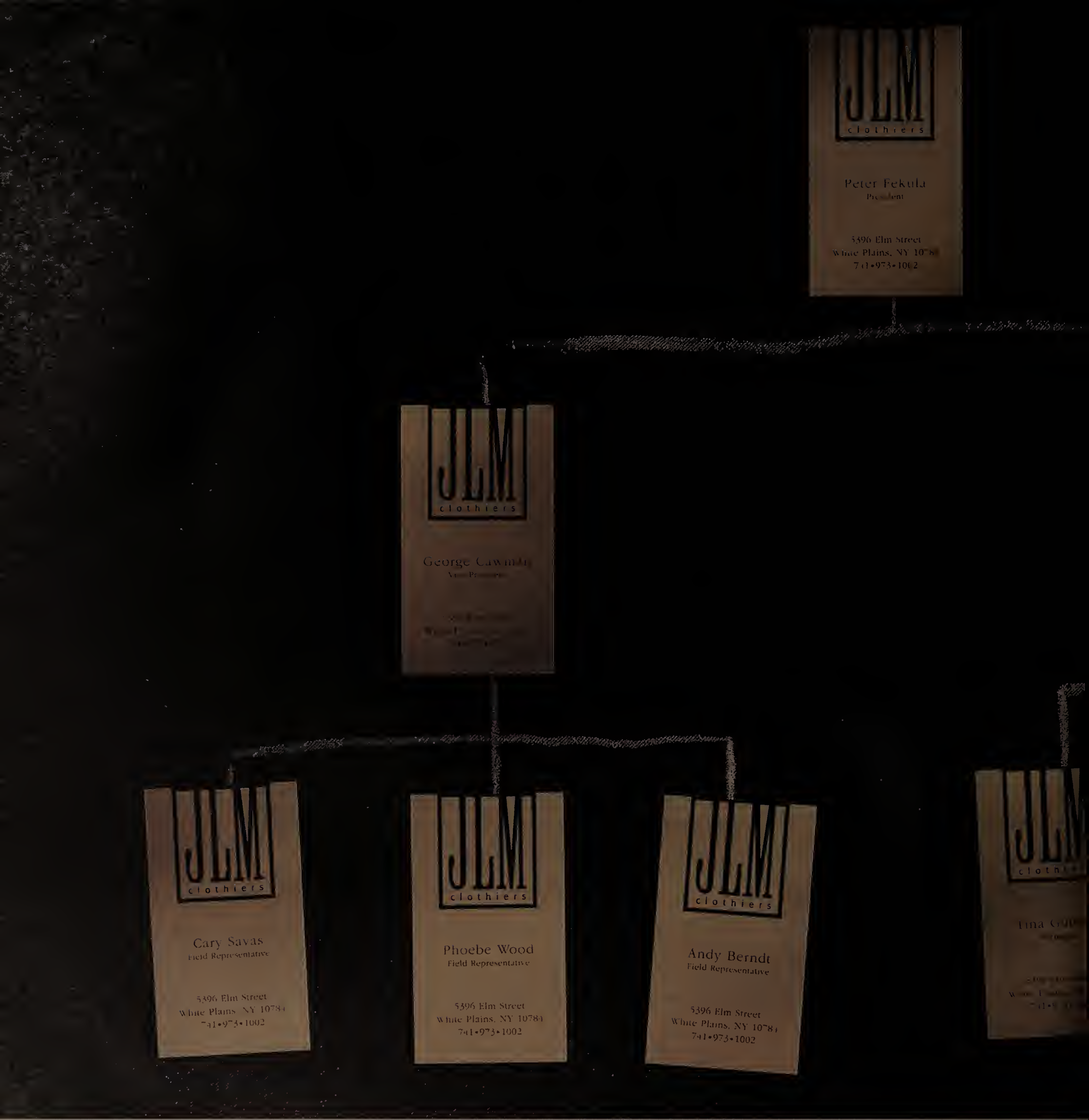
Informix will embed ODBC drivers that access Oracle7 and Sybase System 10 databases in the Windows versions of its NewEra, HyperScript Tools, ViewPoint and ViewPoint Pro front-end tools.

Informix said NewEra and HyperScript Tools contain the ODBC drivers now. ViewPoint and ViewPoint Pro will contain the drivers by mid-1995, the company said. Prices for the products containing ODBC drivers will remain the same.

©Intersolv: (301) 230-3200; Informix: (415) 926-6000).

Of the 7.6 million computers purchased in 1993 by U.S. businesses, Apple Computer, Inc. sold 464,200, or 6%.

SOURCE: DATAQUEST, INC., SAN JOSE, CALIF.



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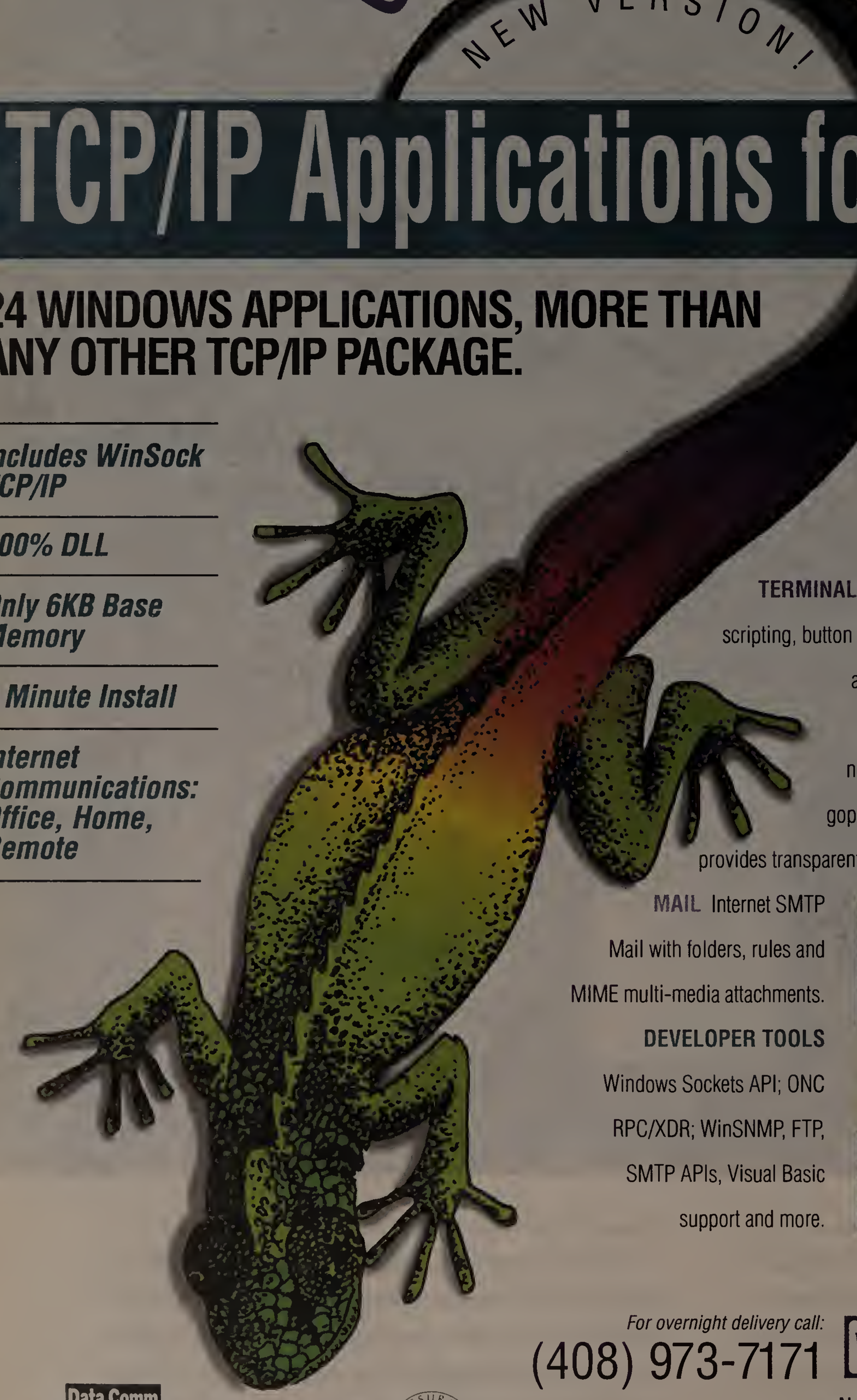

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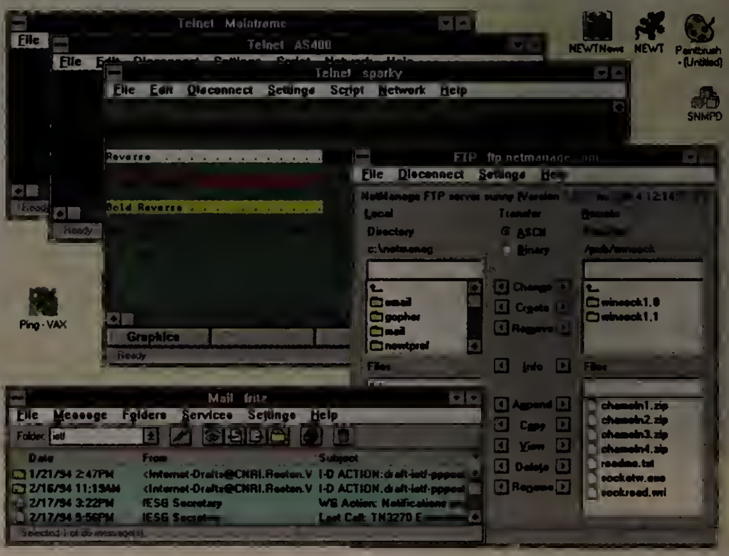

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Data Comm MAGAZINE
TESTER'S CHOICE

BUYERS ASSURANCE SEAL
May 1993

Motorola chooses Iona ORB to develop ground stations

Orbix meets CORBA spec, has hooks to other systems.

BY ELIZABETH HEICHLER

London

Motorola, Inc. has chosen object-oriented technology from Dublin, Ireland-based start-up Iona Technologies, Ltd. to provide the software communications infrastructure for its future Iridium Global Cellular Network.

Iona's Orbix object request broker (ORB) is being used in the development of software for the ground stations that will contain the intelligence for everything from satellite navigation control to telecommunications switching.

Iridium is scheduled to go on-line in 1998, with Motorola promising to provide the first wireless communications network that spans the world.

"Orbix is the backbone. It's one of the most important pieces of software we're procuring," said David Castillo, lead software designer of the system control segment of Iridium.

Orbix is Iona's implementation of the Object Management Group's Common ORB Architecture (CORBA) specification. In an object-oriented software architecture, ORBs provide communications between different software applications distributed over a network.

Follow UP

The decision to use distributed, object-oriented technology came early in the design process, Castillo said, because of the need to make different pieces of software – some legacy, some off-the-shelf and some newly developed – work together.

Motorola goes into Orbix

Will use object-oriented technology from start-up Iona Technologies, Ltd. to build Iridium, a global wireless network.

Iona's CORBA-compliant ORB supports:

- ◆ Distributed objects
- ◆ DCE
- ◆ Kerberos

Iridium facts:

- ◆ Is a 66-satellite cellular net.
- ◆ First satellite will be launched in 1996.
- ◆ Network is due to go on-line in 1998.

"We needed to bring together a number of applications and marry them into a cohesive, evolutionary architecture," Castillo said.

"Time to market was a big issue. We wanted to use off-the-shelf software and yet develop a framework and separate implementation from interface," he added.

Once Motorola decided to use a product built to the industry-standard CORBA specification, it evaluated most of the ORBs available at the end of last year, Castillo said. It found Orbix to be an easy-to-use, robust, reliable and faithful implementation of CORBA that handles many of the complexities of distribution, leaving programmers to focus on functionality, he added.

"What we liked about Orbix is that it is well-designed and has so many hooks to other systems. We can integrate DCE and Kerberos, for example. And it's also very true to the C++ mind-set and philosophy," he said.

The global Iridium system will consist of 66 satellites in low-earth orbit that support wireless hand-held devices capable of transmitting voice, facsimile and data.

EARLY DELIVERY

Although the Iridium network does not go live until 1998, the software to control it must be ready long before that, Castillo said. His team will deliver major pieces of the project in phases beginning in early 1995. The Orbix communications infrastructure will be stress-tested by May of next year.

Castillo's group has been using the multithreaded version of Orbix for Solaris. The early version was under-featured, he said. But Motorola gave Iona a good deal of feedback, and the current release, Orbix 1.3, incorporates many of the features requested.

"We have a whole new features list for [Iona]," Castillo said. "We view them as a partner."

➡ Heichler is a European correspondent for IDG News Service.

GROUPWARE APPLICATIONS

Lotus Organizer integrated with Notes, Windows

BY KEVIN FOGARTY

Cambridge, Mass.

Lotus Development Corp. unveiled a new version of its Organizer personal information manager (PIM) at NetWorld+Interop 94 last week.

The new version will be integrated with Notes and run on a Microsoft Corp. Windows server, as well as enable users without E-mail to access its group scheduling capability.

Organizer, one of Lotus' SmartSuite desktop applications, is a graphical information manager designed like a notebook. Users click on "tabs" of the notebook to access a daily calendar, to-do list, address book, notepad and yearly calendar.

The new version, due in the fourth quarter, will let users on a net set up meetings with Organizer using either Notes or cc:Mail directories, said Barbara Baird, director of product marketing for messaging-reliant applications at Lotus.

Lotus re-Organizes

Organizer PIM will hit the network with the following enhancements:

- ◆ Group scheduling using cc:Mail or Notes.
- ◆ Ability to attach files to meeting schedule requests.
- ◆ New section to track incoming and outgoing calls.

Previous versions of Organizer used only cc:Mail to transport meeting invitation requests.

The new version will use a Notes user directory and Notes mail for transport.

The scheduling function will work with any Vendor Independent Messaging (VIM)-compliant E-mail system, Baird said. Lotus is currently beta-testing a Dynamic Link Library that would let Organizer work over E-mail systems using Microsoft's Messaging Application Programming Interface (MAPI), she added, but Lotus has not set a release date for a MAPI version.

Meeting requests sent to users who do not have Organizer on their desktops arrive as E-mail messages, Baird said.

Version 2.0 can also function on single-server networks that do not use E-mail.

The option is designed to appeal to small businesses and workgroups, according to Baird. To use Organizer without an E-mail system, a LAN administrator would have to build a user file that would reside on the server. A scheduling agent would also reside on the server, querying clients periodically to build a schedule of free time for each user.

It works without E-mail on Novell, Inc.'s NetWare, IBM's LANMan or Artisoft, Inc.'s LANtastic networks. The cc:Mail- and Notes-enabled versions work the same way, using dedicated DOS or Windows servers.

The E-mail-free version of Organizer will make it easier for small users to get into automated group scheduling, said Karl Wong, an analyst at Dataquest, Inc. in San Jose, Calif.

A version of Organizer for the Apple Computer, Inc. Macintosh platform includes only group scheduling functions, not any PIM functions.

Organizer has a list price of $149, with an upgrade price of $49. SmartSuite 3.0 customers get a free upgrade.

©Lotus: (800) 872-3387, Ext. 9164.

Progress

Continued from page 45

pages between clients and servers, which is useful when applications are deployed across multiple operating systems or networking protocols, the company said.

Also new to Version 7.3 is a graphical version of Results, the company's query tool, and Report Builder, the first graphical reporting tool. Later this year, Progress will announce technology that will let developers build reports on client workstations and move those reports to the machine where the data resides, Phelen said.

Analysts described Version 7.3 as a strong offering and cited a much-improved user interface as a strength.

"Their last version [7.2] was their first cut at a graphical user interface," said Don DePalma, a senior analyst at Forrester Research, Inc. in Cambridge, Mass. "A lot of thought went into this release as to how to improve that GUI."

The Progress relational DBMS is most widely used in departmental client/server applications. Unlike Oracle's and Sybase's database offerings, Progress' relational DBMS is sold mostly through value-added resellers, which offer custom applications based on Progress' DBMS. Progress said it is working to expand its market to include departments in large organizations. According to the company, it will add replication features to the Progress relational DBMS next year. The firm also plans to support more than two dozen languages.

Available now, Progress 7.3 costs $2,900 for a single-user license running on Windows; $23,000 for a 16-user license on Unix; $111,000 for unlimited users on Unix.

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Evolution

Continued from page 45

Kernochan, director of commercial systems research at Aberdeen Group, Inc., a market research firm in Boston.

John Rymer, an analyst at the Patricia Seybold Group, Inc. in Boston, said vendors are not only buying or allying with each other at a healthy pace, but each is offering a range of functions previously offered by niche players.

"The client/server market has been fragmented," Rymer said, and vendors have specialized in certain technology areas. Powersoft, for example, specialized in client-side development tools, and is now branching out to let users develop code to run on the server (*NW*, Aug. 29, page 31).

PUSHING FOR INTEGRATION

Users are getting more experience and realizing they need underlying facilities such as repositories, Rymer said. Given that, he said there's a push to integrate functions such as testing, debugging and design tools into one, unified environment.

Users are also frustrated with the lack of scalability in many client/server tools, observers said.

"Users are finding they can build an application and it tests fine, but when they get it in use, they have problems scaling it up," Kernochan said.

Most development tools today are Windows-based and, therefore, single tasking and single threading. As a result, it is difficult to partition code between clients and servers, which is what's needed to make the applications run well on large networks.

Users said they want tools that can be used to build on-line transaction processing (OLTP) applications, handling thousands of transactions per second and hundreds of concurrent users, for example.

"Whoever [comes out with a tool] that can handle 3,000 transactions a second like on big iron will have something. There's nothing in client/server that can do that," said an application development manager at a major airline who asked not be be named.

"Users are finding they can build an application and it tests fine, but when they get it in use, they have problems scaling it up."

Vendors, however, minimized the importance of OLTP compared with other types of homegrown applications.

"That transaction activity is going to be a small part of the whole client/server platform, even though it gets lots of attention," said Tom Herring, vice president of marketing and business development at Powersoft in Concord, Mass.

Rymer agreed that most client/server applications are used for decision support but said it is not simply the weaknesses of the tools that is to blame. Few users are moving OLTP applications off the mainframe because client/server platforms do not offer the reliability, predictability and throughput of the mainframes, he said.

BREAKING UP APPS

Analysts said it is more important that client/server tools allow users to partition applications across multiple processors. Rather than running all the transactions through one processor, which requires an application capable of handling huge volumes, users will break applications into chunks and run pieces on different processors.

"SQLWindows lets you build cool stuff, and PowerBuilder lets you build cool stuff. But users want to share work in the form of a common formatted object," said Matt Miller, marketing manager at Gupta.

In the future, front-end tool vendors will enable users to knit together objects developed with different tools using C++, according to Miller.

Another innovation to watch for is the ability to model business processes, analysts said. Such tasks, which have traditionally been handled by computer-aided software engineering tools, will increasingly become part of the front-end environment.

Users want to build business models into their applications so the software knows the indirect effects of input, Kernochan said. If an accountant enters a change in tax rates in an accounting program, other applications in the enterprise should be able to pick that up and incorporate the changes to their applications, he said.

Users are hopeful that client/server development tools will become more viable for mission-critical applications, and are placing much of their faith in objects.

"I don't see products like PowerBuilder alone providing this over the long term because they're proprietary. I'm looking to technologies like Object Linking and Embedding and OpenDoc to enable us to share objects and accomplish what we need to do," said Bob DelRossi, director of information systems at Liberty Financial in Boston.

Comments?
See "Contacts" box on page 2.

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What makes Passport so different is its unique FrameCell architecture, quite simply a new class of networking. FrameCell combines the best features of packet/frame switches, routers, time division multiplexers and cell switches, while overcoming many of their limitations.

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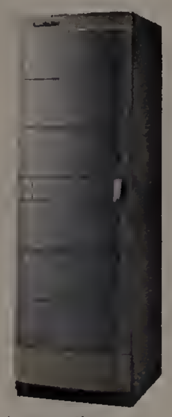
So Passport interfaces with virtually any type of equipment you have – Ethernet, Token Ring, FDDI LANs, frame relay, voice and video – to create a single, highly efficient network. With Passport's intelligent routing and end-to-end congestion management, you can rely on it for your most mission critical applications. And the Magellan Network Management System gives you the ability to control it all, from accounting to security, including support for IBM's NetView, SNMP device management, OSI interworking and Application Program Interfaces (APIs).

Passport is just one part of Northern Telecom's Magellan Broadband Multimedia family of products and services that includes Magellan Concorde, Magellan Gateway and Magellan DPN-100. They're all part of a vision of *broadband multimedia networks*, a vision driven by a comprehensive understanding of customer requirements. And all this is made possible by Northern Telecom, a global leader in packet networks and digital switching systems.

So instead of just thinking gigabits, think giga-flexible – the kind of flexibility you get only from Magellan Passport. To start building your enterprise network with unprecedented flexibility, call 1-800-NORTHERN (press 1 and ask for extension 207).



The Magellan Passport: a new class of enterprise network switch.

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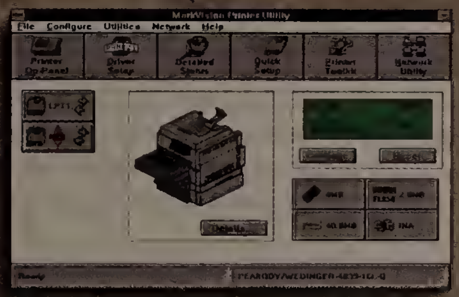

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EDITORIAL

Windows on the world

This week we submit two Windows-related items for your approval.

On page 32 of our Local Networks section, you'll find the first "Windows Connectivity Forum," a weekly column focusing on the challenges of networking Windows machines. The column goes hand-in-hand with our sponsorship of a new CompuServe on-line forum of the same name that will provide readers with a wealth of information, support options and software to ease the job of Windows networking.

The Windows Connectivity Forum (or WINCON for short) goes live today under the direction of the Windows Users Group Network (WUGNET), which runs the widely used WUGNET forum on CompuServe and publishes "The Windows Journal" newsletter. WINCON will provide a forum for our readers and others to exchange information and opinions about Windows connectivity issues, as well as get advice and tips from WUGNET's sysops and vendor support representatives.

The forum will feature discussion areas on key Microsoft products such as Windows NT, Windows for Workgroups, E-mail and network management. You'll be able to download Internet software and other communications-related packages, including demos of new software packages through *Network World's* NetAccess area. You'll also be able to get in touch with our reporters and columnists.

Each week, we'll tie everything back into the pages of *NW* through the WINCON column, where WUGNET's staff will offer advice on Windows networking, talk about new features of the WUGNET forum and give you a flavor of the user discussions taking place on-line.

The WUGNET forum is still evolving, with new features (including news summaries and electronic columns) rolling out over time. Its value increases as more readers participate, so take a cruise through and let us know what you think. (You'll find information on how to access the forum at the end of the column.)

Also on the Windows front, we're running the second article in our three-part series exploring Microsoft's role in setting computing and network standards.

This week's installment looks at customer concerns about Microsoft and what users want from the software giant.

We'd like to hear from you on the issue. Are you standardizing on key Microsoft specifications like Object Linking and Embedding (OLE) 2.0, Messaging Application Programming Interface (MAPI) or Open Database Connectivity (ODBC)? What role will they play in your enterprise network strategies? Is Microsoft doing enough to open communications with non-Windows machines?

Drop us a line.

➻ JOHN GALLANT jgallant@world.std.com

TELETOONS

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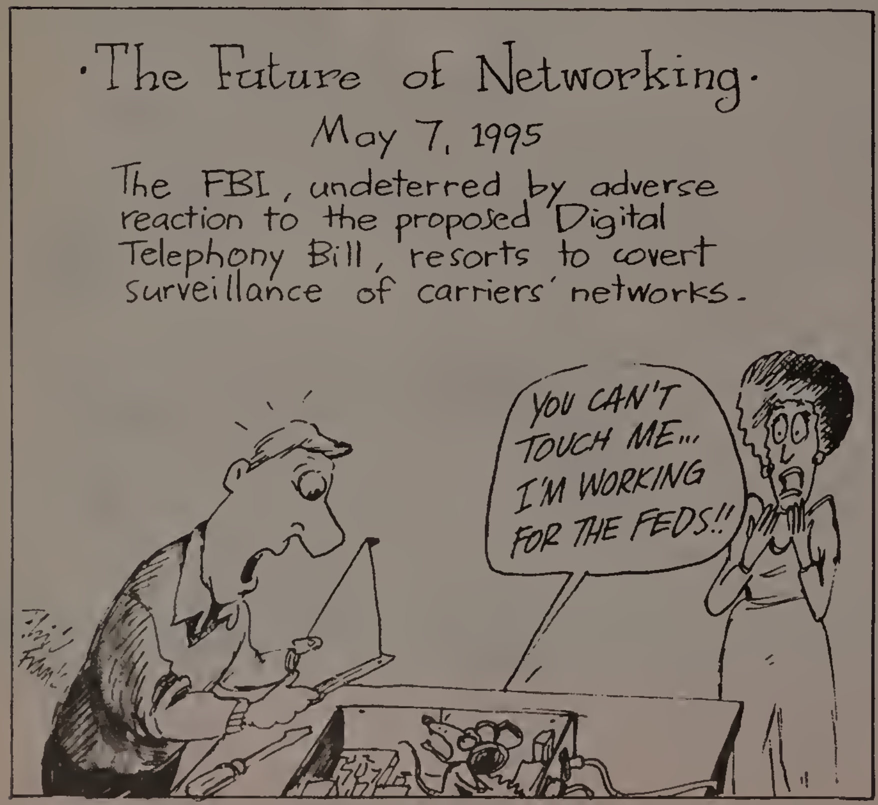
·The Future of Networking·
May 7, 1995
The FBI, undeterred by adverse reaction to the proposed Digital Telephony Bill, resorts to covert surveillance of carriers' networks.
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SPEAKING THE LANGUAGE

by Linda Musthaler

NetWare for PowerPC gives users a choice, but little else

The forthcoming version of Novell, Inc. NetWare 4.1 for Apple Computer, Inc.'s new PowerPC-based workgroup servers (*NW*, Aug. 15, page 13), due out by year-end, presents a RISC-y proposition for users. Beyond the freedom of choice the product will provide, it won't offer many other benefits for the average NetWare user. In fact, at least initially, the product will present a few drawbacks that might slow the corporate movement to NetWare on the Apple servers.

I can understand why these two powerhouse companies think that NetWare on Apple's new Reduced Instruction Set Computing-based servers is a good idea. For Apple, it legitimizes the company's move into corporate America. Apple has long admired the humongous market share that Novell's NetWare enjoys in business environments. Apple's strengths, meanwhile, have traditionally been in the educational arena. Native NetWare running on an Apple server platform will give Apple a strong story to tell to corporate customers, to whom Apple hopes to provide servers as well as user-friendly desktop computers.

As for Novell, this is one more step toward having a ubiquitous net operating system (NOS). A few years ago, Novell announced its commitment to Processor Independent NetWare (PIN), a version of NetWare that would run on virtually any hardware platform. While NetWare 4.1 for the PowerPC is not a version of PIN, it does, however, give Novell one more check mark under the hardware platform column in NOS buyer's guides. The official story from Novell is that this product "gives customers the freedom to choose the best hardware platform that meets their needs."

Let's take a closer look at just what this product announcement means to the average corporate network manager. NetWare — Version 4.1, to be exact — will soon be available for Apple's new servers based on the PowerPC 601 RISC chip. NetWare will run natively, which means that no Apple operating system will sit between NetWare and the hardware. For all intents and purposes, NetWare on this platform will look and act exactly like NetWare on the more common Intel-based Complex Instruction Set Computing (CISC) platform.

Pundits may argue that the PowerPC chip offers a better price and performance level than Intel Corp. 486 and Pentium offerings. I won't get in the middle of that argument — I believe a case can be made either way. The fact is, you now can choose your server platform, and you can rest assured that NetWare will perform the same in either scenario — CISC or RISC.

The average NetWare manager, however, feels pretty comfortable in the Intel world and may not even care to give the Apple servers a look. I have a few reservations myself based on the drawbacks that the typical corporate customer is likely to encounter.

First, there may be fewer add-ons in the form of NetWare Loadable Modules (NLM) available for PowerPC. The NLMs that run under the present version of NetWare 4.X should only need to be recompiled to run under the PowerPC version of NetWare. However, not all independent software vendors are rushing to recompile their software, so users may have fewer add-on application choices, at least for a while.

Next, I'm not convinced that Apple has done everything to make its servers as solid as those file and application superservers that come from Compaq Computer Corp., Hewlett-Packard Co., IBM and others. By solid, I mean that Compaq and the others have performed significant engineering feats to ensure that their servers are highly fault resistant and fault tolerant. For instance, a Compaq server can tell you a component is likely to fail long before it does, giving you time to gracefully change out the component.

By talking with Apple, I learned that the company is turning to third-party vendors to provide some of those types of fault-tolerant features. This could be Russian roulette for your mission-critical applications. What Apple does have to offer, however, is a cost-effective application server that performs in a stellar fashion in CPU-intensive situations. For instance, an imaging or publishing application on the PowerPC server really sings.

My last reservation is the fact that NetWare 4.1 on the PowerPC does little to improve the integration of Apple Macintosh computers on the network. The one thing that will improve this situation — independent of the server — is a better NetWare client for the desktop. Apple and Novell say this is coming, but it has no relationship to the server the NOS runs on. So, even using an Apple server doesn't guarantee better integration for your Apple workstations.

I can, however, see how this new NOS offering would be beneficial for Apple's targeted audience: the educational market, organizations with mixed desktop devices and organizations with entrenched Apple nets. For these customers, Apple and Novell are offering a growth path to a more powerful NOS than AppleShare on a very powerful server. Yet, current Apple customers can take comfort in knowing they don't need to change vendors to get a high-end solution.

Apple admits it is not trying to set the world on fire with NetWare on PowerPC. Right now the company is trying to "get the basics right" in order to gain respect in the corporate arena, which has been so elusive to Apple over the years. Apple wants to provide a solid networking solution to mixed environments with an eye on the price/performance ratio.

Oh, and one more caveat before you buy: This initial release of NetWare for the PowerPC from Apple will look and act just like your same old familiar NetWare on Intel platforms. However, neither Apple nor Novell will rule out the possibility of customizing NetWare for the Apple platform, giving it a more Apple-like look and feel. This could create a dichotomy in NetWare and a nightmare for those network managers who have to administer and manage both flavors. I can just hear network managers saying, "Let's see, I know that command is under the INSTALL.NLM menu on the Intel server. I wonder which cute little icon it is on the Apple?"

When it comes to your NetWare server choice, do the risks outweigh the RISCs? It depends on your current allegiance to Apple. But for now, it certainly is nice to have a choice.

➻ Musthaler is vice president of research at Currid & Co., a Houston-based technology consulting firm. She can be reached at (713) 789-5995.

TELECOM SERVICES

by James Carlini

Utilities are hungry for a piece of the pie

We've heard all about the cable companies' plans to offer local phone services and the regional Bell holding companies' efforts to become long-distance providers. Yet hardly any attention has been paid to a quiet development that could have an even greater impact on users than the 1984 divestiture of AT&T: a bid by the electric utility companies to become providers of local and long-distance telecommunications services.

At a seminar held in Washington, D.C. this summer, executives from electric utility companies focused on Strategies for Information Superhighways. The ultimate objective of these strategies is for the electric utilities to become providers of local and other network services, thereby giving users another access ramp onto the Information Superhighway.

If the electric companies achieve this objective, what will it mean for users? More options to choose from, and a better bargaining position for local and long-distance network services. Just think of the possibilities.

For example, Consolidated Edison of New York, Inc. could soon be asking users: "Do you want a free T-1 line with that half a megawatt of power? We are running a special this month."

Or one user could soon be telling another: "Basic rate ISDN? We already have SONET services in place from the power company!"

What type of market would it create for users? One that monopolies will fight over for new turf and new customers. It is much easier for the electric utilities to develop a telecommunications division than it would be for the phone companies to get into, say, the nuclear power business.

To succeed, the electric companies need to hire some visionaries that can see beyond their traditional core business of supplying power. The current executives may not want to expand their business because they cannot fathom the new markets. If they hire some aggressive personnel that can focus resources on this area, users might have a whole new realm of options to explore.

Even though the traditional local exchange carriers have a cash cow — the local phone network pumping in monthly revenue no matter how bad they bumble at trying to sell new network services — they are already being hassled by aggressive upstarts such as Metropolitan Fiber Systems, Inc. and Teleport Communications Group, Inc.

Imagine what would it be like if the local carriers had to line up against the local Edison company that has a huge cash cow of its own in order to retain customers. Buying a couple of 5ESS central office switches from AT&T or some DMS switches from Northern Telecom, Inc. would be a drop in the bucket for an electric utility, which could then establish some sophisticated network services fairly quickly.

Even finding qualified personnel might not be a huge problem for the electric companies. Among the ranks of the unemployed are thousands of people who have been laid off by the phone companies, many of whom would be eager to make the transition. Since many of the ex-Bell personnel were let go unceremoniously, they would no doubt work extra hard to ensure that the power companies would become competitive.

All of this would provide a new dimension of choices for users. Just think of having an alternative that has as much, if not more, economic staying power as the phone company. It would be a great battle between giants that would spend a huge amount of money to woo customers into their lane of the Information Superhighway.

➡◆ Carlini is president of Carlini & Associates, Inc., a Hinsdale, Ill.-based consulting firm. He can be reached at (708) 986-1888 or via the Internet at carlini@nwu.edu.

PHONE FRAUD

by Daniel Briere

800-service abuse affects everyone

When AT&T announced its crackdown on 800-service abusers (*NW*, Aug. 22, page 6), you may have paid little attention because either you don't have 800 service, someone else monitors your 800 service, you have a fraud protection plan or you had other things to do.

Well, it's time to wake up. This is an important issue that can sneak up and cost you a lot of money. Unlike most of the 800 fraud issues, this type of fraud does not require you to have 800 service to get nailed. Actually, you get hit when someone dials an 800 number from your premises. That makes virtually everyone reading this newspaper a potential victim.

Here's why AT&T is kicking up a storm:

Say someone comes into your offices and asks to make a toll-free call from the lobby phone. The receptionist says, "No problem." The caller then dials an 800 number that belongs to an "information provider," which is a nice way of saying Dial-4-Smut. Because this is the first time the caller has dialed this 800 number, he is prompted through a series of questions that basically assign a membership to that caller, based on the calling line identification (CLI) of the caller.

That's right, *your CLI.*

The caller does not have to listen to the messages at that time; he can merely call back later from any phone, enter the previously assigned membership number, and all calls will be billed to the original CLI. The charges will then show up on your local phone bill with all the rest of your local toll and operator services calls.

The worst part is that it is impossible to control this type of fraud. It used to be that we were protected from 800 calls since they were free. Now this new brand of telecommunication bandit is threatening the 800 franchise itself. In 1993, the telemarketing industry generated more than $300 billion in revenue, most of that over 800 lines. What would happen if people started to get wary of dialing 800 numbers?

The line has to be drawn clear and fast. This issue is not new — it was brought up in the 1992 Federal Telephone Disclosure and Dispute Resolution Act and was not adequately dealt with then.

AT&T deserves some credit here. Before, most carriers would just shut off an offending information provider's 800 number. Today, due to 800 portability, the provider can just switch its 800 number to another carrier and be up and running again in hours. By seizing the number, AT&T is effectively seizing the provider's business. If the provider wants to get up and going again, it has to start over with a new 800 number and new advertising.

In just a few weeks, AT&T already has shut off a double-digit number of abusers. However, AT&T can turn off only abusers that use its net. To totally halt 800-services fraud, three things are required:

First, all carriers need to meet and agree on a uniform way of dealing with this issue. Carriers should stop merely quoting policy; this requires an across-the-board response. Information on abusers needs to be shared and immediate termination made requisite.

Second, local telephone companies need to stop providing billing services for abusive information providers. The providers then will have to use a third-party biller, which is expensive and does not give the provider any leverage to make someone pay up.

Finally, users need to complain, explicitly, about 800-service abuses. Tell the FCC this is the major issue that it is. Everyone has a lot invested in having 800 numbers stay user friendly.

We do not want to get into an environment where telecommunication managers are screening 800 numbers at PBXs the way that they do with 900 numbers. Everyone loses in that scenario.

➡◆ Briere is president of TeleChoice, Inc., a Verona, N.J., consultancy. He can be reached at (201) 239-0700 or via MCI Mail at 445-4690.

Letters have moved this week to page 80.

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Special Issue

Can **NetWare** *be all things to all users?*

Novell, Inc.'s new CEO, Bob Frankenburg, has put his stamp on the LAN software giant by creating a vision for pervasive computing. Pervasive, as in everywhere. As in the enterprise, not just the workgroup.

But Novell faces some trying times ahead if it aims to become the Swiss army knife of the networking industry. The company just put a nail in the coffin of its AppWare application development platform. Oh, Novell will say it still is supporting Visual AppBuilder, but it has decided to drop its AppWare foundation because customers didn't support the concept.

Consider that a blow to the folks in Provo, Utah. AppWare was held high by Novell just a little more than a year ago as an example of how the firm could address enterprise users' requirements for network application development.

Don't worry, Novell will recover. Its SuperNOS plan to marry NetWare and Unix servers appears on track. But for Novell to really score some points with enterprise net users, it must address some real enterprise network needs. Asynchronous Transfer Mode services promise to transform how NetWare may operate on a LAN. Corporate net managers also need Novell to develop a cohesive plan to provide open, standards-based messaging services across the enterprise. In addition, users want to get more out of their NetWare servers, and they want the option of multiprocessor support.

Novell, as the following stories show, is focused on meeting these key user requirements. Like a Swiss army knife with all its parts, Novell wants to be all things to all users when delivering on Frankenburg's vision of pervasive computing. The issue, though, is timing. Novell needs to take a leadership role and deliver advanced functionality before others do.

If the vendor fails, it risks building an army knife with one sharp edge and some other dull parts.

CHARLES BRUNO cbruno@world.std.com

INSIDE

▸ Novell paves bumpy road to ATM

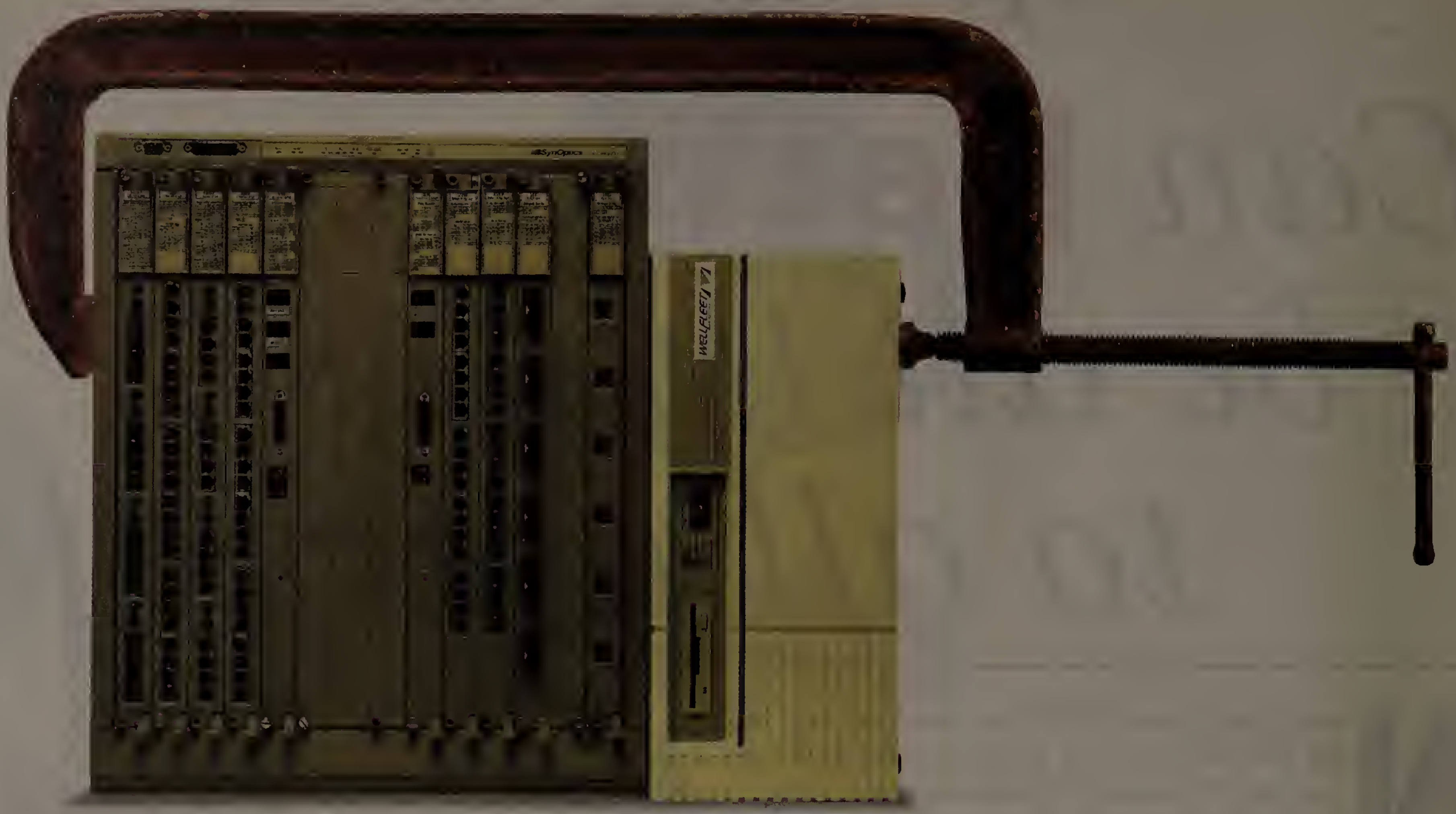
Novell seems to be the only major NOS company talking about Asynchronous Transfer Mode nets, but that doesn't mean the road it has paved to ATM will be a smooth one for all users. *Page 60.*

▸ Parcel post or first class?

The acquisition of WordPerfect Corp. sends a clear signal to users that Novell is serious about outfitting NetWare with enterprise-level messaging services. But the vendor has to move fast to deliver the goods before its rivals do. *Page 63.*

▸ NetWare with a multiprocessing twist

Users want more server power, and Novell has served up a mid-life kicker for NetWare by offering big gains for NLMs and will maximize server MIPS across the enterprise. *Page 65.*



MERGING TECHNOLOGIES

Hub and router technologies are merging. Network management is no longer an option. ATM and packet switching will soon make virtual networking a reality. Let's face it, the networking industry is changing. And while those in the industry with incomplete solutions scramble to acquire the pieces they're missing, one company is already putting the puzzle together. That company is Cabletron Systems.

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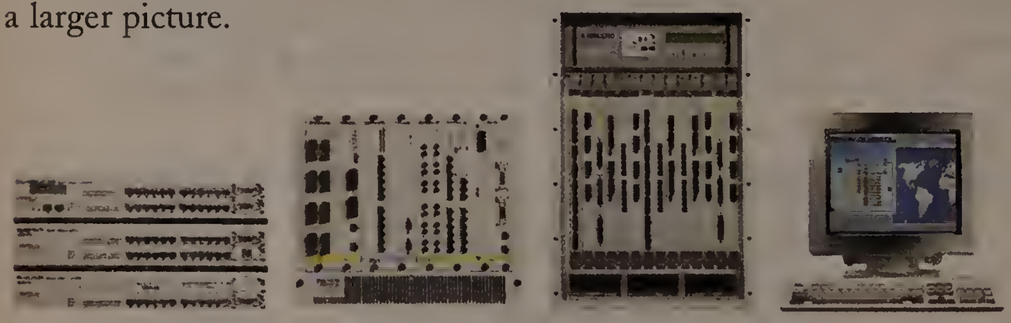

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Circle Reader Service #42

EMERGING TECHNOLOGIES

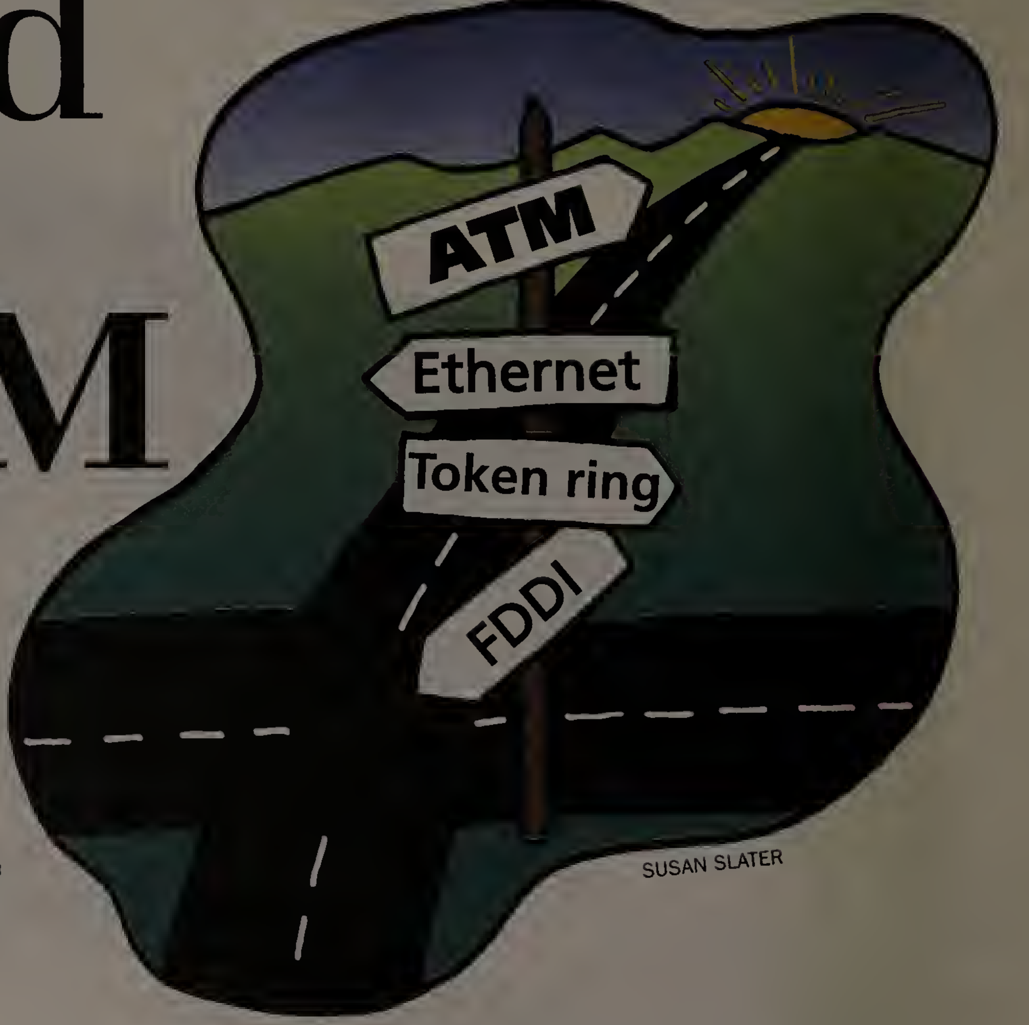
Special Issue

NetWare

Novell paves road to ATM

By Tony Croes

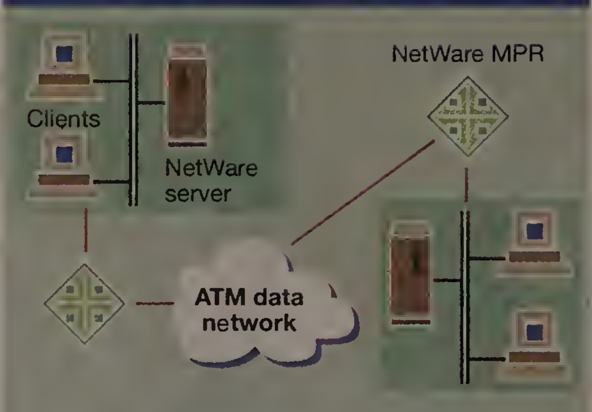
NOS giant is at work on three fronts to provide interconnection, LAN emulation, native services.



SUSAN SLATER

You've probably seen a lot of information recently about the implications that Asynchronous Transfer Mode has for the future of networking. ATM, after all, promises to erase the distinction between LANs and WANs, while providing a host of other benefits — among them, scalable bandwidth, guaranteed quality of service (QoS), simpler internetworking and improved network manageability.

LAN interconnection via ATM



Novell's LAN Interconnection will allow routers to support ATM over a campus or wide area. The downside, though, is ATM merely replaces current wide-area facilities such as T-1 and frame relay services. End nodes on legacy LANs cannot take advantage of ATM's scalable bandwidth or quality-of-service guarantees.

GRAPHIC BY SUSAN SLATER

Yet with all the hubbub generated by ATM switch manufacturers, the contingent of major network operating system suppliers has been relatively quiet — with Novell, Inc. being the exception.

At a recent seminar series hosted by Madge Networks, Inc. in Boston and San Francisco, Madge Networks, along with Cisco Systems, Inc., Newbridge Networks, Inc. and Novell, and came together to discuss ATM implementation issues.

Among the issues that were high on the customers' lists of concerns were the cost of implementing ATM, the undeniable need to support the existing infrastructure and the need for an industrywide standard for LAN emulation over ATM. Novell has already scoped out a path to get users there — although the choices the vendor will offer users have their trade-offs.

NOVELL AND ATM

Novell is committed to supporting ATM and has embarked on a three-phase migration strategy for integrating ATM in NetWare LANs, according to Donald McCullough, senior product manager in the NetWare Enterprise Products Division. The first step, called LAN Interconnection, uses ATM as a high-speed transport service to ferry data between local networks or out to wide-area nets. In essence, LAN Interconnection is a fancy name for positioning ATM to replace T-1, frame relay and other popular net transport services.

Novell plans to go beyond LAN Interconnection by eventually offering LAN Emulation, which enables traditional LANs and directly attached ATM network nodes to appear as though they are part of an Ethernet or token-ring segment, even if they are geographically dispersed. And finally, Novell will offer support for native end-to-end ATM, providing bandwidth negotiation facilities to stations attached either to ATM or legacy LANs.

LAN INTERCONNECTION

Novell's base method for integrating ATM into NetWare nets, LAN Interconnection, is already available. LAN Interconnection supports net communication between routers attached to an ATM net (see graphic).

ATM switched virtual circuits or permanent virtual circuits between routers carry encapsulated LAN traffic across the ATM fabric. In this scenario, only the routers communicate with one another via ATM — end stations and servers cannot directly access the ATM backbone.

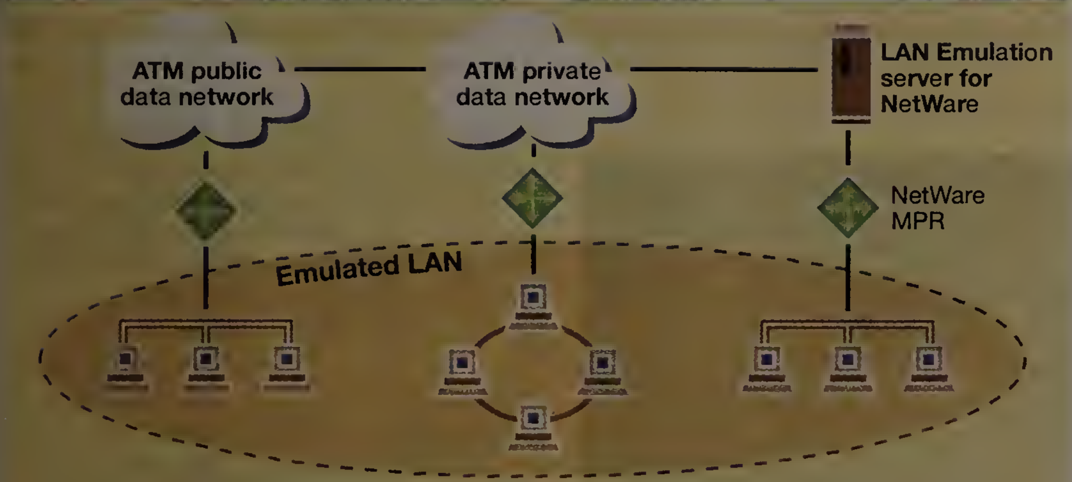
Falling prices

Some ATM adapter vendors, including Fore Systems, Inc. and Sun Microsystems, Inc., have announced availability of ATM NICs at prices below $1,000. Standard Microsystems Corp. and IBM have announced future availablity of ATM NICs, which will sell for about $500.

With LAN Interconnection, ATM functions similar to existing frame relay networks — all servers and end stations are still connected to legacy networks and a router is required to move traffic from one net segment to another. In effect, ATM merely replaces current wide-area facilities such as T-1 and frame relay services. Although the ATM link provides scalable bandwidth and QoS guarantees, the necessity of traditional routers prevent network servers and end stations from taking advantage of these services.

The advantage of using ATM as a backbone lies in its ability to provide uncontested and scalable bandwidth, while providing an infrastructure that can later support LAN Emulation and end-to-end ATM services.

Novell's vision of ATM LAN emulation



LAN Emulation allows ATM to appear as an Ethernet or token-ring LAN to end stations. However, emulated LANs are unable to provide a guaranteed quality of service, and they can only communicate with each other via a router.

GRAPHIC BY SUSAN SLATER

LAN EMULATION

The next step for Novell is LAN emulation. With millions of Ethernet and token-ring nodes installed on today's shared-media LANs, it's easy to understand why network implementors aren't quite ready to replace the existing infrastructure. The technology that allows legacy LANs to integrate with ATM is called LAN Emulation. Although the ultimate goal is end-to-end ATM, vendors and customers alike agree that LAN Emulation is a crucial step in migrating to ATM.

LAN Emulation allows the ATM switching fabric to appear as an Ethernet or token-ring LAN to directly attached end stations (see graphic). This facilitates communication between ATM-attached network nodes and nodes attached to legacy LAN technologies.

With LAN Emulation, Ethernet and token-ring packets from the legacy LANs are disassembled and encapsulated into ATM cells by a traditional router. These cells are then forwarded to destinations across the ATM fabric at ATM speeds. Traffic originating on an ATM net is forwarded to the legacy LANs by a router. Both the ATM- and legacy-attached stations perceive that they are connected to a common local network segment.

The benefit to this approach is that it frees users from geographic boundaries. LAN Emulation makes the ATM network appear as a collection of simulated legacy LANs. Since there is no boundary between LANs and WANs with ATM, these emulated LANs can span geographic regions will little degradation in network performance.

Novell is developing several software components in support of the ATM Forum's emerging standard for LAN Emulation. The first component is a set of ATM Open Data-link Interface (ODI) drivers that permit ATM adapters to be added into NetWare clients and servers. With an ATM adapter in a server or NetWare MultiProtocol Router (MPR), NetWare can direct traffic between ATM and legacy LANs.

The 32-bit Windows client (the first client scheduled for development) will allow Windows workstations to reside as directly attached nodes on an ATM network. Novell intends to develop ATM client software for other operating system clients, as well.

Novell will make these ODI software components available to ATM adapter vendors. This standard ODI foundation will make it easier for ATM adapter vendors to immediately support NetWare since they need only to develop the Hardware Specific Module for their adapter (Novell claims this is a one-man-month project).

Better management

Emulated or virtual LANs facilitate better management of network adds, moves and changes by eliminating the need to reconfigure network node addresses.

Novell also has plans for an ATM LAN Emulation server for NetWare. This server, called a Broadcast and Unknown Manager (formerly known as the Broadcast Reflector and Manager), will simulate the broadcast and multicast services of traditional connectionless LANs for the ATM network. This server will provide the advantages of a connectionless LAN, such as address resolution and service broadcasts, to end stations on connection-oriented ATM networks.

Novell intends to develop its LAN-emulation servers and software components according to standards specified by the ATM Forum. The LAN Emulation server is a universal network component, similar to a router. The current NetWare MPR, for example, will operate in mixed operating system environments. By the same token, a LAN Emulation server from Cisco Systems, Inc. or even Microsoft Corp. might be used on a network in place of the NetWare LAN Emulation server or vice versa.

It's still too early to tell how compatible these servers from different vendors will be or even who is developing them. But as the standard firms up, servers from vendors that comply should be able to interoperate.

Taken together, these LAN Emulation prod-

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Continued from page 61

ucts from Novell will allow NetWare servers, NetWare MPRs and application servers to directly connect to the ATM fabric, permitting them to communicate with other ATM-attached nodes and still communicate with legacy LANs.

Although ATM standards are still in development, most vendors expect standards for LAN emulation to be completed by the end of this year. At NetWorld+Interop this past May, Fore Systems, Inc. demonstrated a functional prototype for LAN emulation based on the ATM Forum's draft of the standard.

Fore Systems showed a Windows for Workgroups Ethernet client communicating with a local NetWare server and a separate NetWare server connected to the other server. The two NetWare servers were directly attached to the ATM fabric via LAN Emulation drivers. At the same time, the company demonstrated a Windows NT client connected directly to an ATM network. Also attached were NetWare, Network File System and Windows NT servers, all of which intercommunicated since all were ATM-attached nodes. The Windows NT client may ship by year end, although Novell has not released a specific date.

LAN Emulation, though, is not without its limitations. According to McCullough, emulated LANs are isolated from one another. Even though ATM has the capability of addressing the entire switching fabric, User A on LAN A can't communicate with User B on LAN B without the intervention of a router. Traditional network routers overcome this limitation but also introduce limited bandwidth and latency that negate some of ATM's benefits.

Second, emulated LANs are unable to provide a guaranteed QoS. The introduction of routers into the net negates ATM's ability to guarantee bandwidth and low latency to individual stations on separate networks. As such, ATM LAN Emulation will be less attractive for multimedia applications, which require continuous, uninterrupted data transmission. These limitations will ultimately drive the need for native end-to-end ATM support.

NATIVE ATM SUPPORT

In the last phase of its ATM plan, Novell will provide an infrastructure that will preserve ATM's ability to provide guaranteed bandwidth and low latency to ATM-attached stations across networks. It will address those needs by spinning out a connection-oriented version of IPX, called CO-IPX, that's compatible with ATM nets. Novell has not delivered a time frame for delivery of CO-IPX.

The vendor also will use its broadcast reflector and manager technology to create an infrastructure that supports a logical internetwork layer that essentially will be an abstraction of the physical network. This logical internetwork will permit ATM and legacy net media, such as Ethernet, token ring, Fiber Distributed Data Interface, Arcnet, frame relay and others, to appear as a single net.

First to propose

The proposals being considered for LAN Emulation over ATM networks were originally submitted by Fore Systems, Inc., Madge Networks, Ltd. and SynOptics Communications, Inc.

ATM switches will provide the underlying physical structure for the network, and traditional routers will extend the physical network to the legacy LANs. From the logical network perspective, all of these physical networks will appear as a larger internetwork comprising simulated IPX networks.

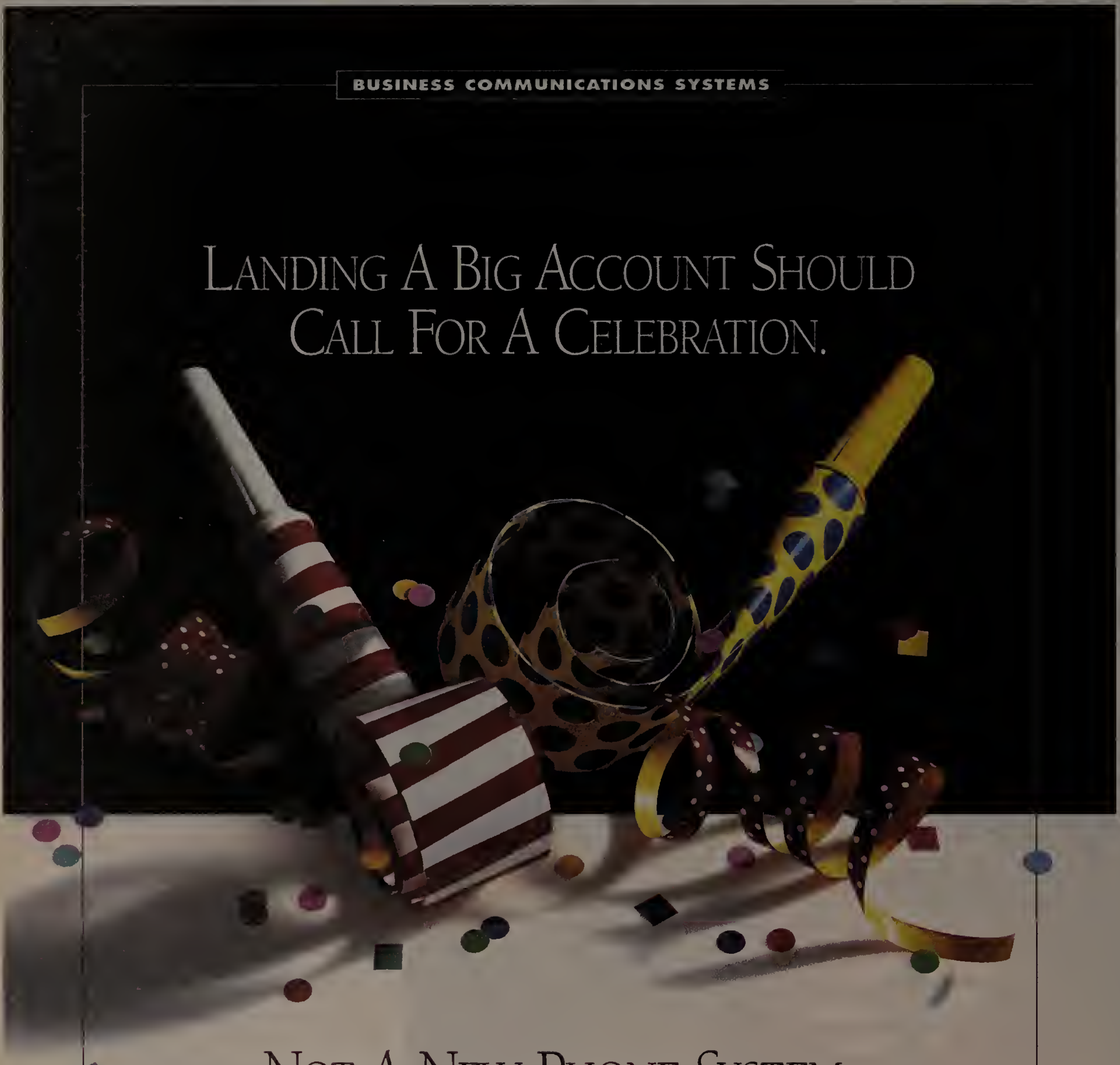
NetWare Logical Network Routers based on CO-IPX and the NetWare Link Services Protocol will provide broadcast simulation, multicast simulation and ATM address resolution for the internetwork. The end result will be the ability to deploy time-sensitive media across geographically dispersed networks, even when the end stations are connected to traditional legacy networks.

In such a case, the application will be able to interrogate the network to determine a suitable QoS. For example, a video server might adjust the resolution and frame rate of its service to a station attached to Ethernet network as opposed to an ATM network.

Outside of the connectivity issues associated with implementing ATM, Novell is working on other technology advancements that will let NetWare users effectively take advantage of ATM and other advanced technologies.

NetWare Directory Services, Novell's Open Messaging Environment, and the NetWare Link State Services Protocol are three good examples of new or changing technologies brought about by the evolving needs of its customers. As you've heard time and again, Novell wants to be your network service provider — and it appears to be working hard to prove it.

➡ Croes is an industry analyst with Currid & Co., a technology assessment firm in Houston. You can reach him via E-mail at tcroes@radiomail.net.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Circle Reader Service #31

Delivering the enterprise message

The union of Novell and WordPerfect signals users that Novell is serious about making E-mail an enterprise network service for NetWare.

BY DANIEL BLUM

With an aggressive enhancement program well under way, Novell Inc. and its new WordPerfect unit have emerged as a strong third force in a triumvirate with Lotus Development Corp. and Microsoft Corp. that appears destined to rule the E-mail and groupware market.

But to compete with Lotus and Microsoft, Novell will need to move from a shared file architecture to a client/server design in order to fully integrate its messaging transport and NOS directory capabilities. It will then have to fuse that with WordPerfect's E-mail client and budding message store/groupware capabilities.

Novell's NetWare Message Handling Service (MHS) has become a de facto standard for many personal computer-based, E-mail distributed applications. MHS handles the collection, routing, and delivery of messages and files through a store-and-forward process over both LANs and WANs.

MHS itself, however, has traditionally been only one component of a PC-based messaging network. Built on the file structures, directories and services of LAN operating systems such as NetWare, MHS requires a front-end mail application to use its services. These include DaVinci Systems Corp.'s DaVinci eMail and The Coordinator; Banyan Systems, Inc.'s BeyondMail; Futurus Corp.'s Team; CE Software, Inc.'s QuickMail; and Notework Corp.'s Notework products.

E-mail front ends and other mail-enabled applications interface to MHS via the shared file system and use an E-mail directory that's usually loaded from the NetWare Bindery's database of LAN users. To send and receive mail, MHS applications place (or receive) the header and note portions of messages in transfer directories using file formats defined in Novell's Simple Message Format (SMF) specification. If needed, attachments may be passed in separate files.

Users can trace the genealogy of MHS through successive generations of the SMF specification. As early as 1988, Novell shipped MHS 1.1 systems based on SMF 64. By April 1991, MHS 1.5 shipped with SMF 70, which was supplanted in late 1992 by Global MHS (GMHS) and SMF 71. Today, GMHS is still shipping, and it coexists with the older MHS and SMF versions as well as with numerous gateways, including Retix's Retix X.400 for NetWare GMHS and Novell's own SNADS for NetWare MHS, SMTP for NetWare MHS and NetWare GMHS to PROFS.

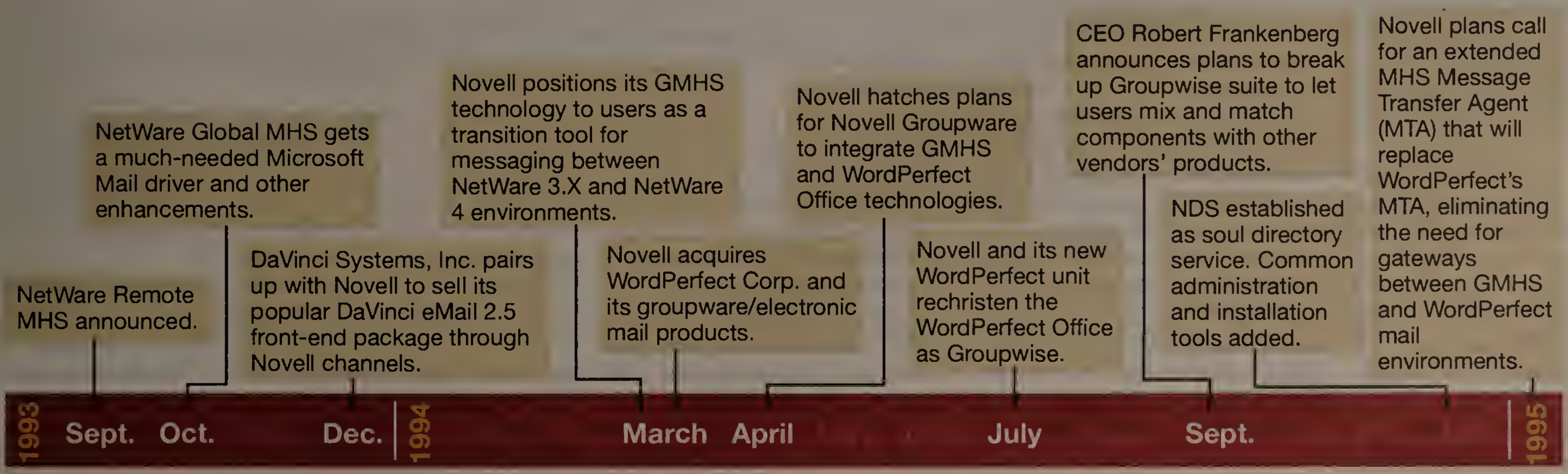
With MHS providing a manageable transport service, this multiclient and multigateway system proved beneficial to millions of users (see graphic, page 64).

"It has been a snap to administer an MHS network with multiple clients," says Terrence McCarthy, a managing

Continued on page 64

Lots of mail

Together, WordPerfect Groupwise and MHS E-mail client vendors claim to have an installed base of more than 6.5 million users.



NetWare Remote MHS announced.

NetWare Global MHS gets a much-needed Microsoft Mail driver and other enhancements.

DaVinci Systems, Inc. pairs up with Novell to sell its popular DaVinci eMail 2.5 front-end package through Novell channels.

Novell positions its GMHS technology to users as a transition tool for messaging between NetWare 3.X and NetWare 4 environments.

Novell acquires WordPerfect Corp. and its groupware/electronic mail products.

Novell hatches plans for Novell Groupware to integrate GMHS and WordPerfect Office technologies.

Novell and its new WordPerfect unit rechristen the WordPerfect Office as Groupwise.

CEO Robert Frankenberg announces plans to break up Groupwise suite to let users mix and match components with other vendors' products.

NDS established as soul directory service. Common administration and installation tools added.

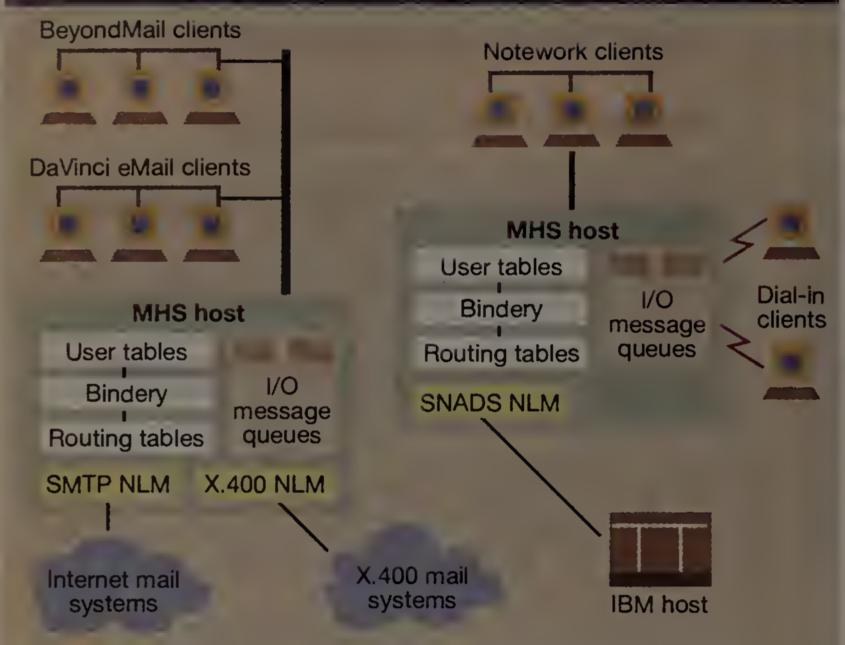
Novell plans call for an extended MHS Message Transfer Agent (MTA) that will replace WordPerfect's MTA, eliminating the need for gateways between GMHS and WordPerfect mail environments.

Continued from page 63

director at Neoteric, Inc., a Novell user and systems integrator. "MHS is the best transport you can get a hold of short of X.400."

But with arch-rivals Microsoft's and Lotus' messaging products gaining in user installed base faster than the entire coterie of MHS client vendors, Novell began in 1993 to shift its strategy away from leaving E-mail client software development to third parties.

MHS' role in NetWare messaging



Under Novell's enterprise messaging strategy, MHS serves as the core message transport service with gateways to other internal and external E-mail systems.

SOURCE: RAPPORT COMMUNICATIONS, INC., SILVER SPRING, MD. GRAPHIC BY SUSAN SLATER

The first sign that Novell's nonalignment in the E-mail client software arena was ending came when it acquired a 15% stake in the largest MHS front-end vendor, DaVinci, and moved toward packaging DaVinci eMail in the familiar red box used for Novell software.

This, however, was not enough. Early this year, Novell stunned the industry by announcing its merger with WordPerfect. That acquisition gave Novell the Groupwise messaging software and applications suite formerly known as WordPerfect Office. The addition of Groupwise and its two million-plus users put Novell on a par with cc:Mail and Microsoft Mail in the struggle for installed messaging user base and could enable the company to better compete with Microsoft and Lotus in the E-mail front-end, groupware and general desktop applications markets.

MIME time

Novell expects to provide support for Multi-purpose Internet Mail Extensions (MIME) this fall.

First, however, Novell and WordPerfect must integrate their messaging product lines. To accomplish this, the new combined company has devised a three-phase convergence strategy.

The first stage maps out interoperability between GMHS and WordPerfect Office (now Groupwise) environments. In order to accomplish this, Novell earlier this month released a Groupwise MHS NetWare Loadable Module (NLM) to unify the two messaging worlds. This allows Groupwise users to complete E-mail, calendaring, scheduling and task management with NetWare MHS users.

The NLM also takes a step toward directory synchronization by enabling user names to be shared across the gateway. This means users do not have to know the system on which mail recipients reside. Novell also will run the gateway as an NLM to increase performance, simplify administration and reduce hardware costs.

In December, Novell intends to deliver on Phase II of its messaging strategy, which will emphasize interoperability between NetWare MHS and Groupwise. At that time, the vendor will focus on common tools and services for administration, directory support and installation. More importantly, Novell will establish NetWare Directory Services (NDS) as the sole directory service. Native messaging services will be embedded in NetWare 4.1 to offer common directory and administrative services.

By the end of 1995, Novell will deliver on its Open Messaging Environment (OME), the third and final component of its strategy. The chief deliverable of OME will be a single common message transport agent that offers backward compatibility with older SMF applications but also makes use of a client/server design and object technology to open up a range of E-mail component choices for users. NDS will continue to be the common directory service, and Novell will add NWAdmin as the preferred administration program.

"We want to guarantee that all of our program installs are the same," says Stewart Nelson, vice president of development for WordPerfect, the Novell applications group. "The goal is to buy down the cost of ownership to make it easier for enterprise users to install and administer messaging services."

Nelson says that traditionally, Groupwise has been a monolithic application and Novell now plans to open it up by creating individual object components. This will enable users to deploy only the facilities they need at any point in time. More importantly, it allows third-party developers to offer their own front-end applications to use with back-end NetWare services.

"We want to create an industry for Groupwise," Nelson says.

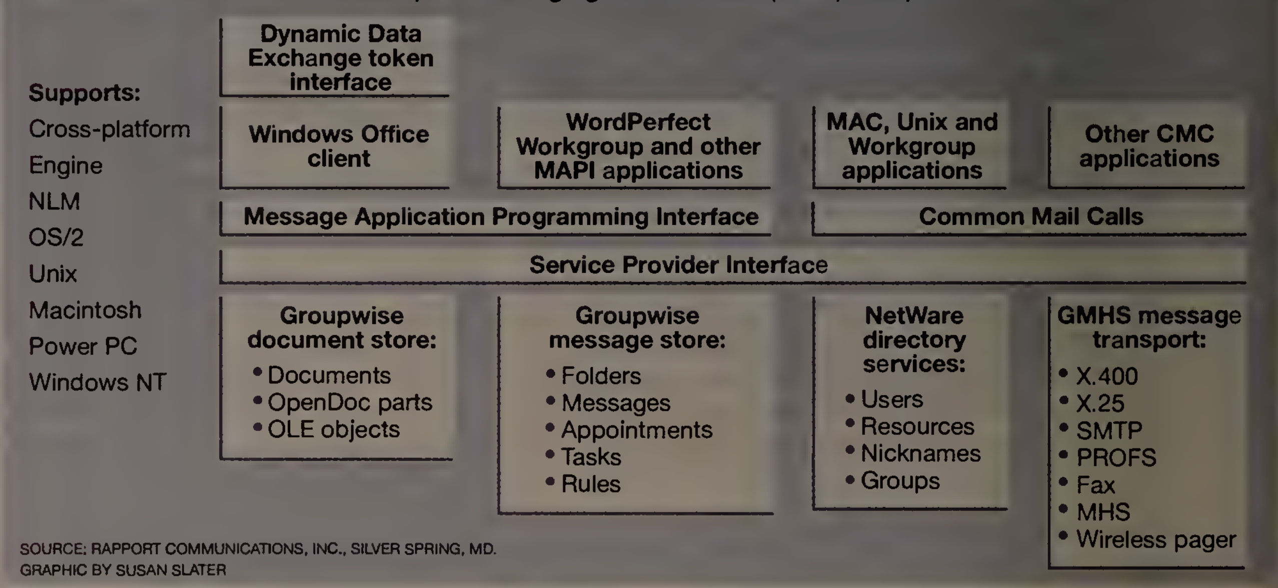
Novell's object component approach and support for key industry standards, such as the Messaging Application Programming Interface, will make it easy for users to swap front-end clients such as those found in Microsoft's Chicago or Lotus' Notes.

In the face of Novell's plans for Groupwise migration utilities, some users may be concerned about third-party MHS clients' ongoing viability. Neoteric's McCarthy thinks users shouldn't be too concerned. "MHS has been an open standard since its inception, and I believe it is Novell's intention to keep it that way," he says. "What Groupwise means is another choice of client. Competition is a good thing."

MHS client vendors are not the only ones facing competition. Just over the event horizon in mid-1995, Novell/WordPerfect will confront the looming presence of Microsoft Exchange and the Lotus Communication Systems (LCS). If these offerings live up to expectations, the current crop of massively deployed cc:Mail and Microsoft Mail post offices and message routers will blossom into enterprise-class messaging servers.

Novell's messaging blueprint

Based on Open Messaging Environment (OME) components.



SOURCE: RAPPORT COMMUNICATIONS, INC., SILVER SPRING, MD.
GRAPHIC BY SUSAN SLATER

These servers could offer client/server support, improved performance and management, and the latest 1988 X.400, X.500, and SMTP/MIME standards-based connectivity options. In addition, they will include replicated message databases and object stores that provide a fully integrated E-mail, groupware and workflow applications platform — something that heretofore has only been available with expensive add-ons such as Lotus Notes.

Phil Schachter

NOVELL CONCEPT

Against these promised offerings, Novell/WordPerfect is positioning the OME architecture and a Novell Groupware concept. OME will be based on Groupwise or third-party clients, the Groupwise Message Store, GMHS transport and NDS (see graphic below).

Beyond the basic messaging infrastructure, Novell is positioning Novell Groupware as a new product family that will leverage the NDS directory services, the NetWare operating system, GMHS and offerings such as Groupwise, WordPerfect Informs and SoftSolutions, Inc.'s Document Management System.

But with the bulk of the Novell/WordPerfect convergence still off in the future, Novell Groupware is still little more than a concept.

However, arch-competitors Microsoft Exchange and LCS have both suffered repeated schedule slips, and during the long wait for their release, Novell will enjoy a substantial tactical advantage if GMHS enhancements scheduled for NetWare 4.1 ship as scheduled late this year.

According to Phil Schachter, product-line manager for messaging products at Novell, the enhancement will feature GMHS embedded as a core service of NetWare, full GMHS integration with NDS, substantially reduced memory requirements and peer-to-peer routing support.

Simple Network Management Protocol instrumentation and other features could arrive with the NetWare 4.1 release or soon thereafter.

Taken as a whole, Novell's messaging strategy will go a long way toward keeping existing users happy, while providing a migration path toward the enterprise-grade E-mail and groupware technology of the future that users need. Only time will tell, however, whether the combined Novell/WordPerfect development path will enable the company to wrest long-term competitive advantage from Microsoft and Lotus in this emerging groupware/workflow arena.

Third-party time

An X.500 directory services gateway to NDS is needed. Novell is presently banking on third parties to provide it.

➡ Blum is a principal at the messaging industry education and consulting firm Rapport Communication in Silver Spring, Md. He coauthored *The E-Mail Frontier,* published by Addison-Wesley in August 1994. He can be reached via E-mail at 4108980@mcimail.com.

NetWare gets a multiprocessing twist

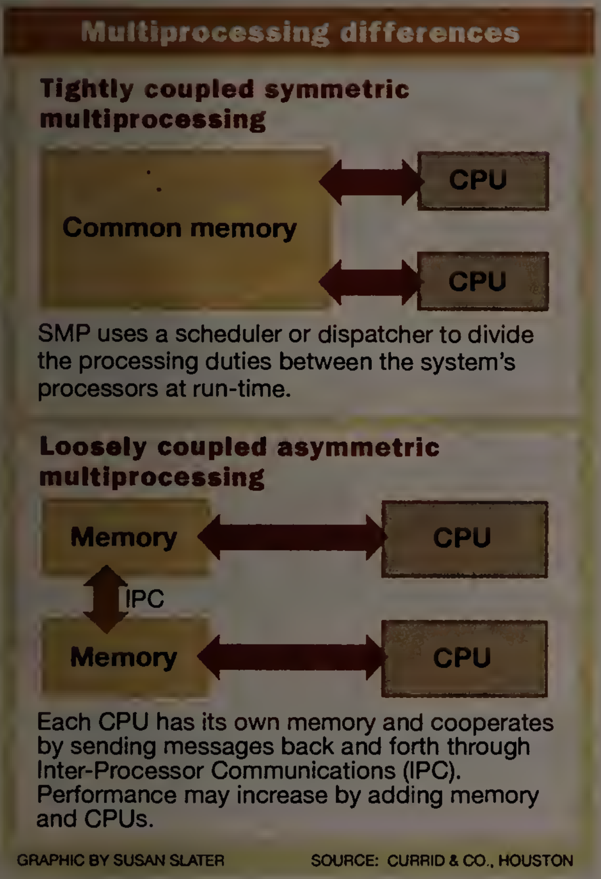
Enhancements in the area of symmetric and asymmetric multiprocessing promise big gains for NLMs and will maximimize server MIPS across the enterprise.

By Josh Penrod

Even though many NetWare servers today do not tax even 50% of their processor's capacity, a variety of factors are combining to create performance bottlenecks that could tap out the network's servers.

The advent of processor-intensive client/server applications, such as distributed databases, multimedia and document imaging, combined with faster net protocols and high-speed system buses, promises to congest even the most powerful server microprocessors.

The upshot is that many NetWare LANs need more — not less — processing power today and will so in future. Novell is attempting to answer this need with a three-stage rollout of its multiprocessor strategy known as Distributed Parallel Processing (DPP). And the changes Novell plans are mind-boggling; but more importantly, they could provide net managers with the tools to run more efficient LANs across the enterprise.



Multiprocessing differences

Tightly coupled symmetric multiprocessing

SMP uses a scheduler or dispatcher to divide the processing duties between the system's processors at run-time.

Loosely coupled asymmetric multiprocessing

Each CPU has its own memory and cooperates by sending messages back and forth through Inter-Processor Communications (IPC). Performance may increase by adding memory and CPUs.

GRAPHIC BY SUSAN SLATER SOURCE: CURRID & CO., HOUSTON

THE TECHNOLOGY

DPP encompasses both major multiprocessing technologies: symmetric multiprocessing (SMP) and asymmetric multiprocessing (ASMP). SMP involves a scheduler or dispatcher dividing the processing duties at run-time through a set algorithm. SMP hardware is known to be tightly coupled since the processors share the same memory (see graphic) to cooperate on processing requests or tasks. SMP systems are generally more effective with a small number of processors. However, since all the processors access and share the same memory chips, performance begins to suffer since the CPUs all vie for the same memory.

ASMP differs from SMP in that the scheduler assigns the processing duties when the task loads, not when it runs. In ASMP hardware, each CPU has its own memory and cooperates by sending messages back and forth through Inter-Processor Communications (IPC). This is known as loosely coupled. ASMP systems are more effective with large numbers of CPUs. Since ASMP systems' processors do not share memory, performance can continue to be increased by adding more CPUs.

Novell's System Fault Tolerence (SFT) III, known for its server mirroring, supports ASMP. In a dual-processor server, the first processor concentrates on providing services and the second processor handles I/O.

Typically, SFT III can represent a performance degradation of up to 30% on a single-processor server, but using a dual-processor unit can allow an SFT III server to operate at 90% of a regular NetWare server — with the benefits of server mirroring. Up to 140% in performance improvement has been reported by using the ASMP capabilities in a single-server configuration, but not with the additional server mirroring.

SMP NETWARE

The first phase of Novell's multiprocessing strategy will bring SMP to NetWare servers. Currently, all processes run on a NetWare server are done so using a single processor. With SMP NetWare, an SMP kernel will allow many of NetWare 4's processor-intensive NetWare Loadable Modules (NLM), such as disk and LAN drivers, to be load-balanced across multiple processors. This leaves more processing time available for non-SMP-aware processes that are restricted to a single processor.

SMP NetWare will be fully compatible with existing NetWare NLMs, eliminating the need to modify current third-party NLMs. However, Novell also plans to release with SMP NetWare a DPP Application Program Interface for those anxious to reap the benefits of multiprocessing.

SMP NetWare is tentatively planned for release about the same time as NetWare 4.1, which should be ready by the fourth quarter. Whether SMP NetWare will be incorporated into NetWare 4.1 or sold as an add-on product still remains unclear.

EXPANDING DOMAINS

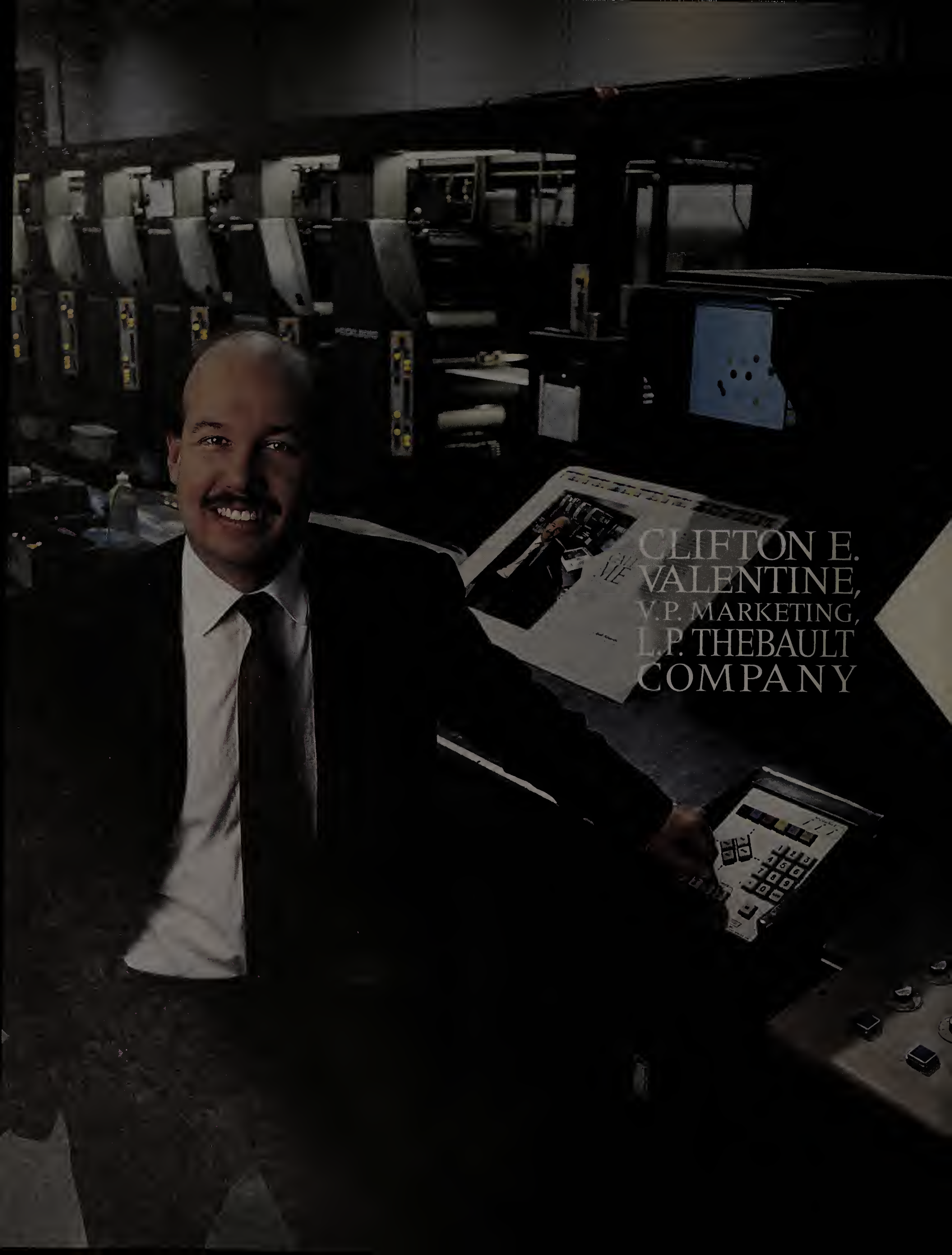
Following SMP NetWare, Novell plans to go one better by expanding on the NetWare Domain Architecture, introduced in NetWare 4.0. Currently, in NetWare 4, the DOMAIN.NLM divides the available server random-access memory into two areas or domains: an unprotected (supervisor) domain and a protected (user) domain. All of the threads that an NLM or group of NLMs creates are kept within the domain to which the NLMs are assigned.

The supervisor area is usually where NetWare's system NLMs run and is unrestricted in its use of the memory. Generally, untested or suspect NLMs are run using the protected area, which is restricted in its use of server memory (see graphic, page 68). This prevents a malfunctioning NLM operating in the user area from appropriating all the available memory and crashing the operating system.

Since the user area's RAM usage is limited, a rogue NLM is prevented from stealing memory from NetWare 4 operating in the supervisor area once the memory allocated to the user area is depleted.

The second phase of DPP builds on this domain architecture and SMP NetWare introduced in Phase 1. NetWare will eventually be capable of providing multiple protected and unprotected domains, instead of a single protected

Continued on page 68



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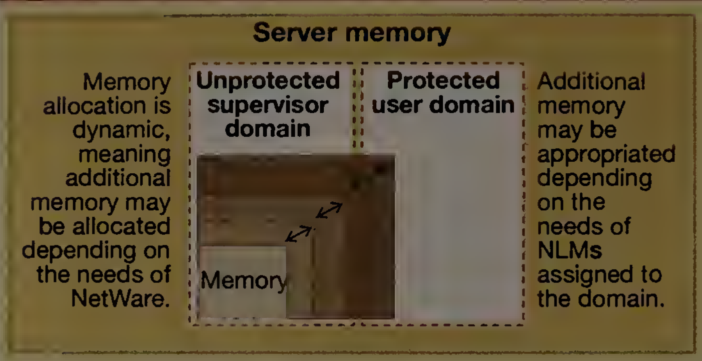
Continued from page 65

and a single unprotected domain. Additionally, these domains will not be limited to a single processor as is true today.

What does it all mean? As with Phase 1, non-SMP-aware NLMs can be limited to domains assigned to use a single processor only, while SMP-aware NLMs can be assigned to different domains that can utilize several processors.

However, the key here is the multiple domains. Not only is the operating system in the supervisor domain protected from the other NLMs running in the user domains, but the user domains also are protected from one another. If a process fails, only the domain in which the process is operating will fail; the supervisor and other user domains will not be affected.

NetWare 4 Domain Architecture


Server memory
Memory allocation is dynamic, meaning additional memory may be allocated depending on the needs of NetWare.
Unprotected supervisor domain
Protected user domain
Memory
Additional memory may be appropriated depending on the needs of NLMs assigned to the domain.

The boundary between server memory domains is dynamic and shifts to accomodate the needs of either domain. When an NLM failure is detected in one domain, the boundary becomes static, so a rogue NLM cannot appropriate excess memory from an unprotected domain, which otherwise would result in a system failure.

GRAPHIC BY SUSAN SLATER

ASMP AND CLUSTERING

The third and final phase for DPP introduces ASMP support and the concept of the virtual server through clustering. A key piece of the Novell ASMP technology is known as Lock Manager.

Lock Manager, developed by NetFRAME Systems, Inc. from Oracle Corp. technology, allows multiple processors to work together on a single task or process. Lock Manager coordinates IPC requests and controls access to data so that no more than one processor updates a data block at the same time.

In addition to ASMP support, this phase extends the domain architecture beyond a single server by allowing a domain to encompass processors from several servers. Novell will accomplish this through the use of a distributed file system, which will enable network servers to make and respond to requests for services from one another.

A group of servers, whether they are single-processor and/or multiprocessor servers, can act as a single unit and pool their available resources. These clusters of servers — a term borrowed from the mainframe world and most often associated with Digital Equipment Corp. VAXes — can employ high-speed links in order to off-load work to unused processors in a domain. In a sense, these servers form a virtual server out of the network's available processors.

This scalability helps use network resources more effectively by first incorporating unused processing power from relatively idle servers before an investment in new servers is necessary.

"This issue is often more important to smaller or departmental networks, although the benefit is there regardless of the size of the corporation," according to Russell Judd, manager of information systems development for Great Lakes Higher Education, a guarantor and servicer of student loans based in Madison, Wis.

"If there are unused [million instructions per second] on a mainframe or minicomputer, someone is going to use them," Judd adds. "This is not always the case in today's PC networks. The ability to cluster servers would provide a network administrator with the best of both worlds: the scalability of a PC network and the efficiency of a mainframe."

The vision for the future of any network operating system should include a pathway for the network to appear to the user as a single resource, with data and services available to users regardless of their locations on the network.

DPP will provide a piece of that puzzle for Novell by allowing the entire network to appear as a single virtual server providing services and applications. The flexible architecture will also allow intelligent management of network performance through distributing the processor work loads and using the appropriate multiprocessing hardware to best fit the situation's needs.

➡Penrod is an industry analyst with Currid & Co., a consultancy based in Houston. He may be reached at (713) 789-5995 or through the Internet at wpouser@curridco{Penrod}.MHS.compuserve.com.

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Buyer's Guide

ATM switch decision can wait

As advancements come in rapid-fire succession and vendors pull in different directions, users should hold off on strategic buys.

INSIDE

- **Adapting your way to ATM success.** ***Page 70.***
- **Identifying the primary ATM network migratory pattern.** ***Page 71.***
- **Buyer's Guide chart gives a cell-by-cell breakdown of key product features.** ***Page 72.***
- **Readers tell how and why they plan to make the ATM switch.** ***Page 76.***

By John Morency

Users examining Asynchronous Transfer Mode switches are getting hit with marketing volleys from all sides today and would be better off waiting until next year before making any strategic purchase decisions.

At one extreme, carriers and vendors of early ATM switches are telling users that ATM services and products are ubiquitously available and all they have to do to realize previously unattainable capacity, true bandwidth on demand and infinitely scalable virtual network services is plug in.

At the other extreme are the naysayers, a large crop of industry consultants and vendors that are pushing such alternative technologies as LAN switching, 100M bit/sec Ethernet and Fiber Distributed Data Interface. The naysayers assert that real ATM services and truly useful ATM switching products are at least three to five years away and that anyone who claims otherwise is guilty of the most severe smoke-and-mirrors marketing exercise.

As is often the case, the truth lies somewhere in between those extremes. The ATM Forum — the key industry body for ATM standardization — has developed enough specifications to let vendors build products that follow basic guidelines and interoperate at the simplest of levels. But each ATM switch on the market still has its own proprietary twist.

Due to both growing technical complexity and the significant number of players now involved in the market, the evolution of ATM standards is slowing down, however. As the ATM Forum continues to evolve its stack of standards and vendors adhere to the group's implementation agreements, it'll take until at least mid-1995 — if not longer — before more standards-based products and mature ATM network management services become available.

In the meantime, an expanding list of start-up vendors, and even systems integrators, continue to roll out products that attempt to patch holes until standards are more solid. Agile Networks, Inc., for instance, recently announced its ATMizer 125 Relational Switch, an Ethernet and ATM switch positioned as a transitional device that will help users move from Ethernet to ATM (*NW*, Sept. 5, pages 1 and 19). Systems integrator Stanford Telecommunications, Inc. released a management application it promises will help users keep better tabs on ATM networks (*NW*, Sept. 12, page 1).

NETWORK WORLD SHORT LIST 1994

ATM switches

Enterprise and workgroup switches

- ✓ **Digital Equipment Corp.** *GigaSwitch/ATM*
- ✓ **Fore Systems, Inc.** *ForeRunner ASX-200 family*
- ✓ **SynOptics Communications, Inc.** *LattisCell family*

Edge switches

- ✓ **Cabletron Systems, Inc.** *9A000 ATM Switch Module*
- ✓ **Hughes LAN Systems, Inc.** *Enterprise Hub*
- ✓ **LightStream Corp.** *LightStream 2010*

Complete details about The Short List appear on page 74.

It's clear that users are nowhere near cashing in on ATM's ultimate promise of providing a universal transparent communications infrastructure that spans local, wide and metropolitan areas at high speeds. Instead, users are sorting out various vendor claims and playing around with at least a few of the ATM switches becoming available on an almost weekly basis in pilot LAN environments.

These pilot environments are designed to gauge how well ATM switches provide a set of core services that vendors say will position them as the key building block for the next-generation LAN. Chief among these services is the ability to shuttle 53-byte cells of data from incoming ports to outgoing ports at blinding speeds ranging from several hundred megabits per second up to gigabit-per-second speeds.

The ability to move data between ports so quickly enables ATM switches to support ATM links operating at a wide variety of speeds. The most widely implemented speed today is the OC-3 rate of 155M bit/sec. But speeds range up to 622M bit/sec on Fore Systems, Inc.'s family of ForeRunner ASX-200 switches and a reported 800M bit/sec on StrataCom, Inc.'s BPX.

A downward slide in pricing is making it more economical for users to pilot ATM today than just two years ago. And that's good news as users rush toward the next-generation LAN environment — one that will handle an increase of 40% to 60% per year in traffic generated by clients and servers that tap ever more powerful Reduced Instruction Set Computing and Intel Corp.

Continued on page 70

Continued from page 69

processors. Also contributing to increased traffic is the deployment of more advanced multimedia applications that incorporate complex data types, including graphics, images and video.

An ATM adapter for Sun Microsystems, Inc. workstations and servers is expected to cost six times less in the first quarter of 1995 than it did in the first quarter of 1993, dropping from $4,500 to $699 in that time span. The per-port price for ATM switches has dropped twofold over the past year, from over $3,000 per port to less than $1,500 per port.

Nearly two-thirds of the 100 readers polled in a *Network World* reader survey responded that they would be implementing some form of ATM pilot in the next year (see graphic, page 76). In addition, 28% of the respondents indicated that they would be implementing some form of production ATM network within that same time frame.

WHAT'S AVAILABLE

Those pilots will likely include a product from one of the two principle ATM switch segments — midsize to large-scale enterprise switches that can be used in campus and wide-area environments, and smaller workgroup switches for departmental LAN settings. However, pilots will expand to include at least one of the many emerging local-area edge concentrators — or edge switches — that support ATM access from existing legacy LANs such as Ethernet, 4M and 16M bit/sec token-ring, and FDDI. Each type of ATM switch can generally be managed from a Simple Network Management Protocol-based workstation.

Enterprise switches cost between $25,000 and $300,000, offer greater than 16 ATM ports, provide switching capacities ranging from 2.5G to over 10G bit/sec and support thousands of ATM virtual circuits per port. These switches also offer strong network management options and have a broad set of features for high-availability and fault tolerance.

Sample enterprise switches include Fore Systems' ForeRunner ASX-200 BX Backbone ATM Switch, Digital Equipment Corp.'s GigaSwitch/ATM, Newbridge Networks, Inc.'s 36150 ATMnet Access Switch and SynOptics Communications, Inc.'s LattisCell Model 10114.

Workgroup switches are typically priced between $12,000 and $25,000, offer 16 or fewer ATM ports, provide a maximum switching capacity of 2.5G bit/sec and support hundreds of ATM virtual circuits per port. These switches also offer varying degrees of network management support and have somewhat limited features for high availability and fault tolerance.

Sample workgroup switches include Newbridge's Vivid ATM Workgroup Switch, Cisco Systems, Inc.'s HyperSwitch A100 and NEC America, Inc.'s NEC ATM Switch Model 5.

ATM edge switches are rapidly emerging to tie legacy LANs into ATM environments. These emerging devices convert existing LAN frames to ATM cells and vice versa. They also perform frame-to-cell address resolution, manage transmission of bidirectional broadcast and multicast traffic, manage traffic flow across different-speed network links and provide basic network management information that technical support staff can use to troubleshoot problems.

Get Focus-ed on ATM

In conjunction with *Network World*, market researcher Focus Data, Inc. is conducting a broad-based study of user requirements for ATM products and services. The report will examine user concerns about ATM and alternative technologies, as well as explore corporate purchasing strategies. For information on buying the report, which costs $950, contact Mona Dabbon of Focus Data at (508) 626-2556.

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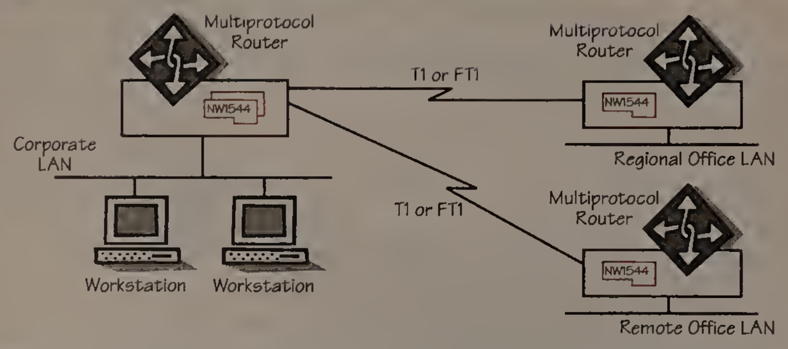

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Adapters are key to successful ATM pilot

Often an overlooked component of a larger switch purchase, selection of the correct adapters will play a major role in bringing success to an Asynchronous Transfer Mode net implementation. When choosing an ATM adapter, users need to examine adapter-to-switch interoperability, performance and support for ATM-specific application program interfaces (API).

ATM adapter-to-switch interoperability has progressed, but there is still some doubt that any vendor's adapter will work with any vendor's switch. This is in stark contrast to more mature LAN technologies such as Ethernet, where effective multivendor adapter-to-hub interoperability is taken for granted.

The rapidly changing nature of ATM means that today's adapter-to-switch interoperability may only be a given if workstation and switch adapters come from the same vendor. And that isn't all bad. Choosing a single vendor may currently yield the best results, especially if a fair degree of end-to-end troubleshooting is required. Fortunately, many current ATM switch providers also sell workstation adapters, particularly for SBus and Extended Industry Standard Architecture products.

Users looking for a wider pool of sources have alternatives. Adapter interoperability tests conducted by neutral third parties such as Bell Communications Research and the University of New Hampshire have generated lists of adapters that can interoperate with multiple vendors' switches at various speeds including 100M bit/sec, 155M bit/sec and the T-3 speed of 45M bit/sec.

Adapter vendors generate their own interoperability lists based on internal testing or user implementation experience. One such example is Interphase Corp. of Dallas, which has demonstrated interoperability between its adapters and switches made by Fore Systems, Inc., Newbridge Networks, Inc. and SynOptics Communications, Inc.

While ATM switch ports are routinely capable of delivering their advertised capacity, the sophistication of an adapter's design determines how much of that capacity will actually be utilized. Current generation adapters offer better performance than the early birds to market.

Most second-generation adapters include a Reduced Instruction Set Computing processor that off-loads cell Segmentation and Reassembly (SAR) functions from the host and improves adapter-to-system memory throughput. In early adapters, it was common to directly deliver cells into system memory, which forced the host to perform SAR functions.

ATM provides a way for end users to request guaranteed bit rates when tapping such applications as desktop video and interactive multimedia that generate constant bit rates and may require isochronous communications. ATM also enables users to effectively control capacity allocations to their desktops through bit rate monitoring.

Today, these quality-of-service guarantees can only be requested through ATM-specific APIs supplied by adapter vendors. These APIs are generally loaded onto the workstation and interface directly to the adapter vendor's ATM driver software.

Also, applications using these APIs cannot directly utilize standard network protocols such as TCP/IP or Novell, Inc.'s IPX without first performing some form of custom integration between the application and host system protocol stack.

There is good news, however. A greater number of APIs are becoming available that support the switched virtual circuit services of the ATM Forum's User-to-Network Interface 3.0 specification. This will greatly assist in adapter-to-switch ATM protocol interoperability.

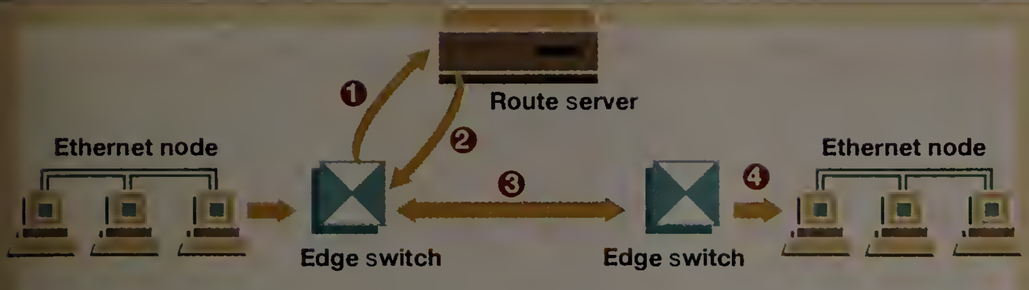
In addition, a subworking group within the ATM Forum's Services and Applications Aspects Group is currently defining more standardized service requests and parameter definitions as the basis for the standardized ATM API of the future. Once such a standard API is available, integrating ATM service elements within mainstream network protocols will become considerably less complex and proprietary.

This standard API, however, is not expected to be complete until 1995 at the earliest, which means vendor-specific interfaces and custom integration will continue to be the order of the day for now.

Pricing should not enter the ATM adapter selection decision for a couple of reasons. First, adapter list prices continue to drop (*NW*, July 4, page 7). The average list price for an adapter now runs between $1,000 and $3,000, depending on speed, vendor and system bus. Fore Systems and Connectware, Inc. offer 100M bit/sec adapters for Sun Microsystems, Inc.'s S-Bus for less than $1,000.

Furthermore, given the fact that many users today are conducting ATM pilots, they only need a small number of adapters, usually less than 20. When buying in such small numbers, it's worth it to pay a bit extra for a product with a solidly proven interoperability record that will keep testing time to a minimum.

Route servers: ATM's address translators



① Edge ATM switch forwards Ethernet packet destined for remote LAN segment to route server.

② Route server supplies the ATM network address and routing instructions needed to reach edge switch supporting remote LAN segment.

③ Edge switch forwards cells into ATM network for delivery.

④ The receiving edge switch reconstructs Ethernet packet and sends over LAN segment.

GRAPHIC BY ANNE GIANCOLA

SOURCE: STRATEGIC NETWORK CONSULTING, INC., ROCKLAND, MASS.

Edge switches come in three different flavors. For instance, ADC Fibermux Corp.'s ATMosphere Backbone, Fore Systems' LAX-20 LAN Access Switch and Newbridge's Vivid Yellow Ridge are stand-alone products that support legacy LAN segment connections on the local side and one or more ports to an ATM switch on the trunk side. NetEdge Systems, Inc.'s ATM Connect Edge Router is a stand-alone router that offers full routing between existing LAN segments and ATM end stations.

Lastly, edge switches can be supplied in the form of add-on modules for existing LAN hubs. Examples of these products include Cabletron Systems, Inc.'s 9A000 ATM Switch Module for its Multi Media Access Center (MMAC) and Micro-MMAC hubs, Hughes LAN Systems, Inc.'s Enterprise Hub and Optical Data Systems, Inc.'s ODS ATM Express for its Infinity Hub series.

Today, most edge switches support some intercept version of the ATM Forum's LAN Emulation standards. Expected to be widely implemented by the second half of 1995, this standard will provide a true multivendor approach to provision of edge switch services.

Prior to adoption of a LAN-emulation standard, however, users should exercise caution in mixing and matching edge switches from multiple vendors because approaches for address resolution, broadcast management and data flow control will likely be proprietary.

The internal mechanisms used to support either cell switching or frame-to-cell conversion vary by product. Enterprise and workgroup switches typically use some form of ATM switch fabric that has been optimized to quickly switch ATM cells from input port to output port based on the ATM Virtual Path Identifier/Virtual Circuit Identifier (VPI/VCI) values contained within the cell header.

An ATM switch fabric is a cell forwarding infrastructure typically implemented in silicon and based on some form of matrix switch or multiplexer design. A switch fabric provides self-routing services for ATM cells based on VPI/VCI values and is designed to minimize cell switching latency.

In addition to providing a basic ATM switch fabric, some products such as Cascade Communications Corp.'s B-STDX 9000 and Cisco HyperSwitch A100 provide additional performance boosters such as cut-through switching. Others, such as Newbridge's 36150, Fore Systems' ASX-200 family and GTE Government Systems Corp.'s Secure Prioritized ATM Network (SPANet) Switch, implement the basic switching fabric through use of a cell switching bus.

For edge switches, the internal mechanism is significantly different. Within an edge switch, the basic objective is to provide efficient conversion between frames for existing LAN technologies and ATM cells, and vice versa. As a result, a shared memory for the storage of both frames and cells is used with the switching operation accomplished via the passing of shared buffer pointers between legacy LAN and ATM interfaces.

These conversions are generally accomplished as complete store-and-forward operations. But some products, such as NiceCom, Inc.'s NiCell 200 and NiCell 1200, provide some degree of switching optimization via cut-through operations.

While there are architectural differences among products in each market segment, there are more important attributes to examine during the selection process. These attributes apply to switches across all market segments and get to the heart of how a particular vendor has selected to provide end-to-end connectivity and interoperability within an ATM environment.

These attributes include which switch-to-switch protocols are used, the type of Connection Management System (CMS) used to create end-to-end connections, mechanisms used to avoid cell loss either within or between ATM switches, and network management services for basic configuration and troubleshooting operations.

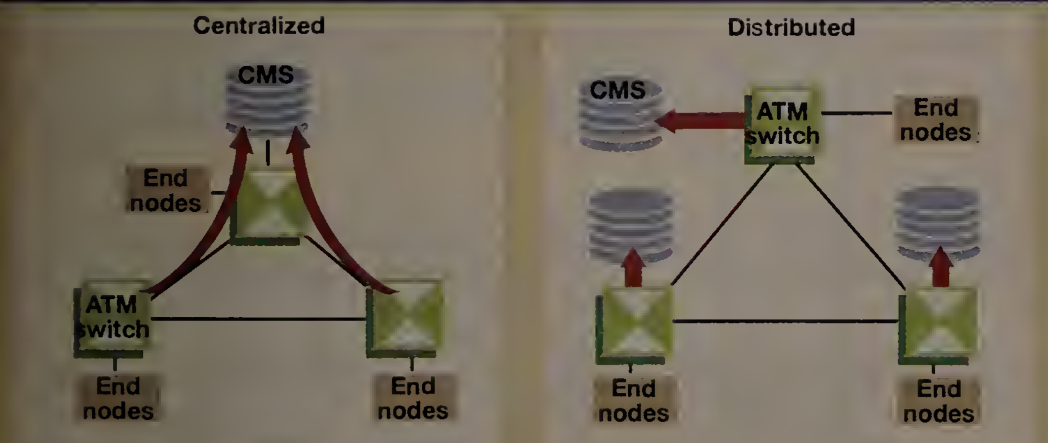
SWITCH-TO-SWITCH PROTOCOLS

While release of the ATM Forum's User-to-Network Interface (UNI) 3.0 specification and pending approval of its UNI 3.1 promises to improve multivendor adapter-to-switch interoperability by mid-1995, the news is not as pleasing when it comes to passing data between switches (*NW*, Aug. 15, page 1). Among other features, UNI 3.0 makes it possible for adapters to issue a standard request for establishment of a switched virtual circuit (SVC) to a destination device utilizing Q.2931 defined services.

However, switch-to-switch interoperability only exists at the permanent virtual circuit (PVC) level today. PVCs establish predefined paths that traffic takes through a series of ATM switches between a sender and receiver. An individual path must be set up for each pair of communicating devices on a point-to-point

Continued on page 73

Connection Management System options



Requests to establish switched virtual circuits (SVC) are handled by one CMS.

Requests for SVCs can be serviced by any one of multiple CMSs.

Criterion	Centralized	Distributed
Scalability	Limited by CMS hardware platform	Processing power added as needed
Complexity	Only requires one resource	Resource is duplicated at each switch
Data management	Single database more easily maintained	Databases must remain synchronized
SVC setup time	Takes longer as usage increases	Load can be balanced as usage increases
Disaster recovery	Single point of failure	Load from failed CMS is spread to others

GRAPHIC BY ANNE GIANCOLA

SOURCE: STRATEGIC NETWORK CONSULTING, INC., ROCKLAND, MASS.

Switched LANs can provide path to ATM

While being positioned by some as an alternative to Asynchronous Transfer Mode nets, LAN switching may very well prove to be a migratory step to eventual ATM deployment.

There are many stand-alone LAN switch vendors today. In addition, hub makers are currently rushing to add LAN switching to their products, giving users a chance to assess how their primary hub vendors plan to pave the way for existing LANs to coexist with and migrate to ATM.

The benefits of LAN switching for technologies like Ethernet, token ring and Fiber Distributed Data Interface lie in replacing performance-limited shared LAN infrastructures with switched point-to-point links between nodes at the full LAN speed. LAN switching can also be used to feed data to a so-called superhub that provides a mix of functionality, such as routing and ATM net interfaces, under one roof.

These superhubs will provide LAN frame-to-cell and cell-to-LAN frame conversion for seamless interworking between legacy LAN and ATM environments. Ultimately, switched LAN services will form the basis of virtual LANs in which a LAN segment becomes a logical entity that can be shared across both ATM and non-ATM technologies.

A recent study conducted by Strategic Networks Consulting, Inc. shows that users perceive the primary benefits of LAN switching to be enhanced capacity and greater performance for both LAN desktop and backbone connections. Coincidentally, these are also the primary reasons why many users are currently evaluating ATM.

It is becoming increasingly clear that existing intelligent hubs can become the strategic platform for linking existing LAN and ATM nets. The optimal future hub product model, therefore, is one in which performance and manageability can be delivered regardless of LAN topology.

The vendor community understands this. By year end, nearly every major hub vendor will be delivering products and services that provide a common platform for switched LAN and ATM net access. Examples include Cabletron Systems, Inc.'s Secure Fast Packet Switching within its Multi Media Access Center-Plus hub, SynOptics Communications, Inc.'s Frame and Cell Switching within its LattisSystem 5000 hub and Hughes LAN Systems, Inc.'s Distributed Frame and Cell Switching within its Enterprise Hub.

While most users seem sold on the potential benefits of switched LANs, they are very skittish about whether vendors can make these services as easily manageable as current shared LAN services. Consequently, users have yet to deploy switched LAN services on any scope broader than a small workgroup or departmental pilot.

Often, the rationale is to deploy these services as a form of bandwidth Band-Aid to incrementally meet the requirements of a select group of power users until ATM or more advanced 100M bit/sec technology becomes readily available.

The gauntlet has been thrown down. To answer this user challenge, intelligent hub makers must provide convincing evidence that switched LAN services can offer equal performance and manageability irrespective of the LAN technology.

ATM switches

Company	Product	Type	Architec-ture	Switch capacity	ATM interface	Max. no. of ports			LAN support	Peak port capacity	Virtual LANs	Bridging and routing		Features				Interop-erability	Mgmt. CPUs	SNMP MIB	Mgmt. system	Base price
		A = ATM-only C = Chassis-based D = Departmental E = Enterprise M = Mixed ATM and legacy LAN S = Stackable	A = ATM switch fabric C = Cell switching bus CT = Cut-through switching S = Shared memory	Bit/sec		ATM-only	Legacy LAN	Total	Max. segments: E = Ethernet F = FDDI T = Token ring	Type: M bit/sec A = ATM E = Ethernet F = FDDI T = Token ring	A = ATM-only AL = ATM and legacy E = Ethernet F = FDDI T = Token ring	Between ATM and: E = Ethernet F = FDDI T = Token ring	Protocol: A = AppleTalk IPX = IPX D = DECnet S = SNA IP = IP O = Other	Autocongestion mgmt.	Dual power supplies	Hot-swappable modules	Route server	N = NNI U = UNI 3.0 P = P-NNI O = Other S = SPANS	M = Per module S = Per switch	M1 = MIB-I M2 = MIB-II R = RMON	H = HP OpenView ND = NetLabs DIMONS NM = Novell NMS NV = NetView/6000 S = SunNet Manager	
ADC Fibermux Corp. (800) 342-3768	ATMosphere Backbone	C, E, M	S	200M	OC-3, TAXI, T-3	1	16	17	E: 16	A: 155 E: 10	AL, E	E	A, IP, IPX	✔	✔				S	M1, M2	H, NV, S	$11,995
Cabletron Systems, Inc. (603) 332-9400	9A000 ATM Switch Module	C, E, M	C	2.5G	OC-3, TAXI, T-3	24	2	26	E: 1 F: 1	A: 155 E: 10 F: 100	A	E, F	IP	✔	✔	✔		S, U	S	M2	H, NM, NV, S	$35,191
Cascade Communications Corp. (508) 692-2600	B-STDX 9000	C, E	C, CT	1.2G (1)	E-3, T-3	14		1,680 (2)		A: 45			O	✔	✔	✔		U, O	M, S	M2	H	$30,000
Cisco Systems, Inc. (800) 553-6387	HyperSwitch A100	A, C, D	A, CT	2.4G	E-3, OC-3, TAXI, T-3	16		16		A: 155	A						✔	U	S	M2	H	$21,900
Digital Equipment Corp. (800) 344-4825	GigaSwitch/ ATM	A, C, E	A, CT	10.4G	OC-3	52		52		A: 155				✔	✔	✔		U, O	M, S		H, NV	$22,000
Fore Systems, Inc. (412) 772-8686	ForeRunner ASX-200 ATM Switch	A, C, D	A, C	2.5G	140M bit/sec, E-3, OC-3, TAXI, T-3	24	1	25	E: 1	A: 622 E: 10	AL, E	E	A, D, IP, IPX, S, O	✔		✔	✔	N, P, S, U	S	M1, M2	H, S	$21,950
	ForeRunner ASX-200 BX Backbone ATM Switch	A, C, E	A, C	2.5G	140M bit/sec, OC-3, TAXI, T-3	24	1	25	E: 1	A: 622 E: 10	AL, E	E	A, D, IP, IPX, S, O	✔	✔	✔	✔	N, P, S, U	S	M1, M2	H, S	$39,950
	ForeRunner ASX-200 BXE ATM Switch	A, C, E	A, C	6.25G	140M bit/sec, OC-3, TAXI, T-3	96	1	97	E: 1	A: 622 E: 10	AL, E	E	A, D, IP, IPX, S, O	✔	✔	✔	✔	N, P, S, U	S	M1, M2	H, S	$51,950
	ForeRunner ASX-200 ATM WANswitch	A, C, E	A, C	6.25G	140M bit/sec, OC-3, TAXI, T-3	40	1	41	E: 1	A: 622 E: 10	AL, E	E	A, D, IP, IPX, S, O	✔	✔	✔	✔	N, S, U	S	M1, M2	H	$79,950
	LAX-20 LAN Access Switch	C, D, M	S	200M	OC-3, T-3	4	40	40	E: 16 F: 8 T: 12	A: 80 (3) E: 10 F: 100 T: 16	AL, E, F, T	E, F, T	A, D, IP, IPX	✔	✔	✔	✔	S, O	S	M1, M2	H, S	$22,950
General DataComm Industries, Inc. (203) 574-1118	APEX-DV2	C, E, M	A	6.4G	OC-3, TAXI, T-1, T-3	32	64	64	E: 64	A: 155 E: 10	A, AL, E	E	A, D, IP, IPX, S	✔	✔	✔		N, U	M, S	M2	H, ND, NM, NV, S	$25,000
	APEX-MAC	C, E, M	A	1.4G	OC-3, TAXI, T-1, T-3	14	28	28	E: 28	A: 155 E: 10	A, AL, E	E	A, D, IP, IPX, S	✔	✔	✔			M, S	M2	H, ND, NM, NV, S	$14,250
	APEX-NPX	C, E, M	A	6.4G	OC-3, TAXI, T-1, T-3	32	64	64	E: 64	A: 155 E: 10	A, AL, E	E	A, D, IP, IPX, S	✔	✔	✔		N, U	M, S	M2	H, ND, NV, S	$32,000
GTE Government Systems Corp. (800) 982-0381	Secure Prioritized ATM Network Switch	A, C, E	A, C	1.2G	OC-3, TAXI, T-1, T-3	24		24		A: 155	A			✔	✔	✔		S, O	S	M2	H	$93,000
Hughes LAN Systems, Inc. (800) 395-5267	Enterprise Hub	C, D, M	A, C	3G	OC-3	28	336	336	E: 112 F: 14 T: 14	A: 155 E: 10 F: 100 T: 16	A, AL, E	E	A, D, IP, IPX, O		✔	✔		O	M, S	M2, R	H	$2,995 - $5,300
Hughes Network Systems, Inc. (301) 601-4299	ATM Enterprise Network Switch	C, E, M	A	3.1G (1)	OC-1, OC-3, T-1, T-3	56	56	112	E: 56 T: 56	A: 155 E: 10 T: 16	AL, E, T	E, T		✔	✔	✔	✔	U	M, S	M2,	H	$33,150
LightStream Corp. (508) 262-1000	LightStream 2010	C, E, M	A	2G	E-3, OC-3, T-3	18	72	72	E: 2,000 F: 2,000	A: 155 E: 10 F: 100	E, F	E, F	A, D, IP, IPX, S	✔	✔	✔	✔	O	M, S	M2, R	H	$30,000-$300,000
NEC America, Inc. (214) 518-5204	NEC ATM Switch Model 5	A, C, D	A	2.4G	OC-3, TAXI, T-3	16		16		A: 155				✔					S	M2		(4)
	NEC ATM Switch Model 10	C, E, M	A	2.48G	OC-3, T-1, T-3	48		768 (2)		A: 155				✔	✔	✔		O				(4)
NetEdge Systems, Inc. (800) 638-3343	ATM Connect Edge Router	C, D, M	S	1.6G	OC-3, TAXI, T-3	4	44	45	E: 16 F: 3 T: 12	A: 155 E: 10 F: 100 T: 16	AL, E, F, T	E, F, T	A, D, IP, IPX		✔	✔		S, U	S	M2	H, NV, S	$9,000 (5)
Newbridge Networks, Inc. (703) 708-5905	Vivid Yellow Ridge	D, M, S	S	120M	OC-3	1	12	13	E: 12	A: 155 E: 10	AL, E	E	IP, IPX	✔			✔	U	S	M1, M2	H, S	$9,995
	Vivid ATM Workgroup Switch	A, D, S	A	1.6G	OC-3	12		12		A: 155	AL			✔			✔	N, P, U	S	M1, M2	H, S	$11,999
	36150 ATMnet Access Switch	C, E, M	A, C	2.56G	140M bit sec, OC-3, TAXI, T-1, T-3	16	16	16	E: 16	A: (6) E: (6)	A, AL, E	E	O	✔	✔	✔	✔		M, S			$15,000-$80,000
NiceCom, Inc. (800) 642-3286	NiCell 200	D, M, S	A, CT, S	430M	OC-3, T-3	1	12	13	E: 12	A: 155 E: 10	AL, E	E	A, D, IP, IPX, S, O	✔			✔	U	S	M2	H	$7,200
	NiCell 1200	C, D, M	A, CT, S	1.28G	OC-3, T-3	8	48	52	E: 48	A: 155 E: 10	A, AL, E	E	A, D, IP, IPX, S, O	✔	✔	✔	✔	P, U	M, S	M2	H	$9,700

ATM switches

Company	Product	Type	Architecture	Switch capacity	ATM interface	Max. no. of ports			LAN support	Peak port capacity	Virtual LANs	Bridging and routing		Features				Interoperability	Mgmt. CPUs	SNMP MIB	Mgmt. system	Base price
		A = ATM-only C = Chassis-based D = Departmental E = Enterprise M = Mixed ATM and legacy LAN S = Stackable	A = ATM switch fabric C = Cell switching bus CT = Cut-through switching S = Shared memory	Bit/sec		ATM-only	Legacy LAN	Total	Max. segments: E = Ethernet F = FDDI T = Token ring	Type: M bit/sec A = ATM E = Ethernet F = FDDI T = Token ring	A = ATM-only AL = ATM and legacy E = Ethernet F = FDDI T = Token ring	Between ATM and: E = Ethernet F = FDDI T = Token ring	Protocol: A = AppleTalk IPX = IPX D = DECnet S = SNA IP = IP O = Other	Autocongestion mgmt.	Dual power supplies	Hot-swappable modules	Route server	N = NNI U = UNI 3.0 P = P-NNI O = Other S = SPANS	M = Per module S = Per switch	M1 = MB-I M2 = MB-II R = RMON	H = HP OpenView ND = NetLabs DiMONS NM = Novell NMS NV = NetView/6000 S = SunNet Manager	
om Inc. 642-3286	NiCell 2000	A, C, E	A, CT	2.56G	OC-3, T-3	16		16		A: 155	A			✓	✓	✓	✓	P, U	M, S	M2	H	$15,200
m, Inc 667-8437	Magellan Gateway ATM Switch	A, C, E	C	1.2G	OC-3, T-1, T-3	24		24		A: 155				✓	✓	✓		U		M1, M2		$41,500- $54,000
Data ms, Inc. 234-6400	ODS ATM Express	C, E, M	A	2.48G	140M bit/sec, OC-1, OC-3, TAXI, T-3	96	528	528	E: 48 F: 4 T: 48	A: 155 E: 10 F: 100 T: 16	AL, E	E	IP	✓	✓	✓	✓	O	M, S		S	$24,890
aCom, Inc 294-7600	BPX	A, C, E	A	9.6G	T-1, T-3	32		32		A: 800	A			✓	✓	✓		U	M, S	M2		$27,950
SynOptics Communications, Inc. (800) 776-6895	LattisCell Model 10114	A, D, S	A	2.5G	OC-3	16		16		A: 155	A, AL		A, D, IP, IPX, S	✓	✓			U, O	S		S	$35,950
	LattisCell Model 10114-DS3	A, D, S	A	2.5G	OC-3, T-3	16		16		A: 155	A, AL		A, D, IP, IPX, S	✓	✓			U, O	S		S	$45,950
	LattisCell Model 10114-SM	A, D, S	A	2.5G	OC-3	16		16		A: 155	A, AL		A, D, IP, IPX, S	✓	✓			U, O	S		S	$45,950
	LattisCell Model 10115	A, D, S	A	2.5G	OC-3	16		16		A: 155	A, AL		A, D, IP, IPX, S	✓	✓			U, O	S		S	$27,950
	LattisCell Model 10124-S	A, D, S	A	2.5G	OC-3, TAXI	16		16		A: 155	A, AL		A, D, IP, IPX, S	✓	✓			U, O	S		S	$45,950
	EtherCell Ethernet-to-ATM-Switch	D, M, S	C, CT	310M	OC-3	12		12	E: 12	A: 155 E: 10	A, AL, E	E	A, D, IP, IPX, S	✓				U, O	S		S	$9,995
Telematics International, Inc. (305) 772-3070	NCX 1E6	C, E, M	A	2.5G	OC-3, T-1, T-3	64		64		A: 155				✓	✓	✓	✓		M, S	M2	H	$35,250
UB Networks, Inc. (408) 496-0111	GeoSwitch 155	D, M, S	A	5G	OC-3	16	2	19	E: 2	A: 155 E: 10	A, AL, E	E	A, D, IP, IPX, S	✓	✓				S	M1	H	$5,995
Xylan Corp. (818) 880-3500	OmniSwitch	C, E, M	A, S	640M	OC-3	8	32	32	E: 32 F: 8 T: 24	A: 155 E: 20 F: 100 T: 16	AL, E, F, T	E, F, T	A, D, IP, IPX, S, O	✓	✓	✓	✓	U	M, S	M1, M2	H, ND, NV, S	$8,250

Products highlighted by color were selected for The Short List.

Chart compiled by Cheri Paquet

FOOTNOTES:
(1) Port capacity allocated on a blocking basis only for Cascade B-STDX 9000, and blocking as well as a nonblocking basis for Hughes ATM Enterprise Network Switch.
(2) Switch supports frame relay or SMDS WAN ports.
(3) Supports full-duplex ATM.
(4) Vendor would not supply information.
(5) Costs $11,250 with software.
(6) Each switching port operates at 160M bit/sec.

MIB = Management Information Base
NNI = Network-to-Network Interface
P-NNI = Private-NNI
RMON = Remote Monitoring
SPANS = Simple Protocol for ATM Network Signaling
TAXI = Transparent Asynchronous Transmitter/Receiver Interface
UNI = User-to-Network Interface

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basis, similar to a private line. AVVPI/VCI number is used to define a path between each communicating pair, which makes construction of any sized ATM network a fairly significant network management undertaking.

Those vendors who support PVCs will generally interoperate on a switch-to-switch basis. Some vendors, such as SynOptics and Newbridge, have a particularly strong set of public references regarding multivendor interoperability at the PVC level.

For ATM to keep true to its promise, there needs to be interoperability among vendor switches at the SVC level. To establish an SVC connection, a sending device uses a global address to request connection to another device. It is up to the switches in the ATM network to provide the appropriate VPI/VCI information that defines the path traffic must take until the devices are finished communicating.

As a basis for providing SVCs, some ATM switches support a dynamic switch-to-switch protocol that is functionally analogous to the Open Shortest Path First protocol supported by routers in TCP/IP environments. Such a protocol will enable switches to exchange information about end devices and how they can be reached, thus effectively automating the creation of SVCs. This offers the benefit of avoiding expensive network management operations required to predefine virtual circuit paths between two end stations.

For ATM to keep true to its promise, there needs to be interoperability among vendor switches at the SVC level.

The ATM Forum has developed both a Network-to-Network Interface (NNI) and a Private-NNI (P-NNI) specification that define different types of switch-to-switch protocols. Both are in draft stages with a few vendors claiming early support of those drafts.

The NNI will be used for multivendor switch interoperability between carriers providing public ATM services, but widespread implementation is at least two to four years out. The P-NNI will provide for switch interoperability in private networks, but it is only just now going out to ATM Forum members for a straw poll. The P-NNI is expected to be finalized by the first quarter of 1996.

In the meantime, support for switch-to-switch protocols in either enterprise or workgroup ATM switches is more the exception rather than the rule and is implemented using largely proprietary methods. Fore Systems and LightStream Corp. are just two of the vendors that have developed proprietary switch-to-switch protocols. Fore Systems is licensing its Simple Protocol for ATM Network Signaling (SPANS) to other vendors and meeting with some success. Fore Systems has also contributed elements of SPANS technology as part of P-NNI's development.

In place of a switch-to-switch protocol, other vendors, such as Newbridge, SynOptics and UB Networks, Inc., utilize a CMS to establish SVCs through an ATM network between cooperating end stations. A CMS is software that runs on a Unix-based workstation, which must be addressable over an ATM network.

THE CMS CHOICE

A CMS, which is also referred to as a switch control point, is the rough equivalent of an operator in the early days of the telephone system. The CMS keeps track of where end stations are located and how to reach them, and feeds this information to ATM switches upon request.

Since ATM is not yet sufficiently mature enough to have all the features required for full end-to-end addressing and connectivity on a multivendor basis, use of a CMS is required for path selection, quality-of-service definition and connection establishment for SVCs in environments that do not currently support a switch-to-switch protocol. Two forms of CMS implementation are possible — centralized and distributed.

In a centralized implementation, the Unix workstation running CMS software has predefined PVCs with every end station and switch. All requests to establish a connection and select a path are first transmitted to the CMS, which then responds with the information switches need to make the link. In the decentralized model, a series of interconnected Unix workstations run CMS software and communicate with each other on a more dynamic basis, making use of ATM switch services. Each workstation maintains a complete copy of the

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The Short List: ATM switches

The Short List highlights products Network World *recommends you examine during the purchasing process for Asynchronous Transfer Mode switches. Products included on The Short List provide top-of-the-line support within a specific environment or are part of a family that meet a mix of needs. Your environment and needs may differ.*

Enterprise and workgroup switches

■ Digital Equipment Corp.

GigaSwitch/ATM

Users needing high-capacity switching and worrying about network congestion will want to examine Digital's GigaSwitch/ATM. The product's 10.4G bit/sec switching capacity is tops among the switches listed in the Buyer's Guide chart on page 72, enabling each of its 52 ports to operate at the OC-3 rate of 155M bit/sec in a nonblocking manner.

In addition, Digital provides its SwitchMaster and FlowMaster software to ensure effective stand-alone and end-to-end performance with little congestion. The GigaSwitch/ATM architecture can support up to 1,000 constant bit rate virtual circuits per port for multimedia or desktop video applications.

■ Fore Systems, Inc.

ForeRunner ASX-200 family

Products in the ForeRunner family run the gamut from enterprise backbone to edge ATM switches. Each member of the family takes an industry leadership position in a number of areas, including a per-port price that starts at a very low $1,495, high switch capacity, a distributed connection management scheme, and such high-availability features as dual power supplies and hot-swappable modules.

Fore Systems additionally provides a wide range of network management services, including its own graphical management platform called ForeView, as well as support for the ATM Forum's Interim Local Management Interface for managing the end station-to-switch interface.

Besides working with Fore Systems' own adapter boards, each family member can interoperate with more third-party adapters and hubs than any other switch vendor. The latest addition to the family — the LAX-20 LAN Access Switch — squarely positions Fore Systems to compete in the evolving edge switch market segment.

■ SynOptics Communications, Inc.

LattisCell family

An early leader in ATM switching, SynOptics has a very strong list of interoperability partners in the adapter card, switch and router categories. SynOptics switches have also interoperated with a number of ATM switches sold to the telephone companies. The company also has one of the more advanced ATM network management platforms in its LattisCell ATM Network Management Application.

Edge switches

■ Cabletron Systems, Inc.

9A000 ATM Switch Module

Cabletron is one of the few hub vendors today that offers ATM switching for its existing hubs, the Multi Media Access Center family. The 9A000 ATM Switch Module supports as many as 24 on-board ATM ports, each of which is compatible with the ATM Forum's User-to-Network Interface 3.0 specification. In addition, Cabletron's longstanding joint relationship with Fore Systems assures a high degree of interoperability between the 9A000 and Fore Systems' ForeRunner products. A broad range of net management options is available for the 9A000 via Cabletron's family of Spectrum Network Management Systems and its Remote LANView for the Windows environment.

■ Hughes LAN Systems, Inc.

Enterprise Hub

The Enterprise Hub takes a unique approach in incorporating a distributed ATM cell switching fabric via the use of ATM switching modules. Each module connects to the hub backplane and contains its own local ATM switching fabric, obviating the need to rely on a centralized ATM switch in the hub chassis. This results in a low-entry price point of $2,995 for a five-slot hub that combines ATM services with a hub architecture that can scale as high as 10G bit/sec. The Enterprise Hub outfitted with ATM switching modules provides full ATM functionality, including a Connection Management System, a route server, hot-swappable modules and standards-based network management.

■ LightStream Corp.

LightStream 2010

The LightStream 2010 offers users deployment options for either local-area ATM switching or premises LAN concentration into a wide-area ATM backbone. In addition, the 2010 offers dynamic self-management of path selection, address resolution and automatic rerouting of failed trunks via a dynamic switch-to-switch protocol that is based on an intercept version of the ATM Forum's Private Network-to-Network Interface. The product can support virtual Ethernet or Fiber Distributed Data Interface LANs and includes routing for TCP/IP, Novell, Inc. IPX, Digital Equipment Corp. DECnet, IBM Systems Network Architecture and Apple Computer, Inc. AppleTalk traffic. Dual power supplies and hot-swappable modules are provided.

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network address and path selection database, thus preventing a single failure from knocking out the network (see graphic, page 71).

Today, switch vendors that support a CMS implement it on a proprietary basis. Given industry trends, it is likely that with the universal deployment of the ATM addressing standard defined in UNI 3.0 and the standardization of the P-NNI protocol, most vendors will make the transition to a more dynamic, distributed connection-oriented management system over time. CMS logic will also start finding its way on to add-on processors that will fit into an ATM switch, thus obviating the need for a separate Unix workstation.

However, the advantages provided by a single, centralized CMS for today's pilot evaluation include far less complexity and greater manageability. This will often result in reduced time to stabilize the evaluation test bed.

ROUTING SERVERS

In addition to providing a basic CMS, some ATM switch vendors also provide a tool that enables TCP/IP traffic to flow across an ATM network. Called address resolution servers — or route servers — these software tools run on an ATM network-attached Unix workstation and basically provide the additional services TCP/IP's Address Resolution Protocol needs to translate a legacy LAN node address to an ATM node address.

But the mission of a route server is much broader than address translation. These route servers provide LAN address discovery, route determination and packet forwarding instructions needed to move data between source and destination end stations connected via edge switches (see graphic, page 71).

Newbridge's Route Server is a prime example of this type of address translator. The Route Server runs on a Unix workstation and is connected via an ATM PVC to a Newbridge Vivid Yellow Ridge edge switch.

The Vivid Yellow Ridge provides physical connectivity between legacy LAN segments, as well as between legacy LAN segments and an ATM network. To do its job, the Vivid Yellow Ridge examines the media access control (MAC) address of each legacy LAN-attached device including routers.

The mission of a route server is much broader than address translation. These route servers provide LAN address discovery, route determination and packet forwarding instructions.

The Vivid Yellow Ridge will assist in getting packets between devices on the same legacy LAN subnet with little intervention. However, it will consult with the Route Server for information on how to process packets going between subnets. If the packet is going to another device on a different subnet, the Route Server provides the instructions the Vivid Yellow Ridge needs to get it there.

But if a packet is addressed to a device that is only reachable across an ATM link, the Route Server will provide the target node's VPI/VCI address. As the Vivid Yellow Ridge chunks the legacy LAN packet up into ATM cells, it will insert the VPI/VCI values into each cell and then forward those cells to a Newbridge enterprise or workgroup ATM switch, which will shoot the cells across appropriate links.

If the destination node is ATM network-attached, the traffic is directly forwarded. If the device is on a remote legacy LAN, another Vivid Yellow Ridge may be required to reconstruct legacy LAN packets from incoming ATM cells and forward them to the right remote subnet.

Similar to the case for CMSs, the protocol used to enable edge switches and route servers to communicate is vendor proprietary. The Internet Engineering Task Force (IETF) is currently defining a standard for address resolution between TCP/IP and ATM, however. The IETF's RFC 1577 will likely become the multivendor standard for route server functions. However, implementation and testing of this standard will take time, and industrial strength implementations are not expected until at least the second half of 1995.

CELL LOSS PREVENTION

For both enterprise and workgroup switches, the ability to sustain deterministic end-to-end performance is a very important purchase criterion. As a result, these switches need to have a strong set of congestion management features to avoid performance blocking and cell loss, which could result in highly crippling throughput and latency degradation for such key applications as imaging, desktop video or interactive multimedia.

Even though most switch vendors claim to have some form of automated congestion management system, implementations vary widely from use of fixed-size cell buffers on each port to more advanced statistical management schemes that use some form of flow control mechanism to dynamically allocate buffer resources to better handle peak traffic.

Port buffers can range in range in size from 2,000 to 5,000 cells. The buffers store cells in memory until the interface board can process them properly. If the buffer is full, then cells are lost. Port buffers are more important on outgoing ports than incoming ports. The speed of an ATM switch bus will quickly move incoming traffic to an outgoing interface. The buffers attempt to keep outgoing interfaces from getting overwhelmed with traffic from multiple incoming ports.

A Strategic Networks Consulting, Inc. report says there are about 1,000 ATM switches and an estimated 8,000 ATM adapters currently installed, which indicates that the great majority of today's ATM usage is largely for workgroup pilots.

A better way to prevent cell loss is to use a flow control tool that takes the size of port buffers into consideration before it sends out messages that instruct other network switches to slow down until it can catch up. The ATM Forum is currently weighing the benefits of credit- or rate-based flow control as a standard mechanism.

Digital's FlowMaster is an example of a credit-based scheme. Used in Digital's GigaSwitch/ATM, FlowMaster ensures that one switch will not transmit cells unless it is ensured that the receiving switch has enough buffer space to accommodate them.

The ForeSight service found on StrataCom's BPX switch is an example of a rate-based mechanism. Rate-based schemes enable a congested switch to pass instructions to other switches in the network to drop to a lower speed and to specify that speed.

GTE Government Systems uses two levels of buffering hierarchy in its SPANet Switch. The tool SPANet uses combines extremely low intraswitch latency with very substantial per-port cell buffers of 8,000 cells.

The low intraswitch latency and large buffers are designed to better enable SPANet to handle constant bit rate traffic such as voice or video over variable rate traffic such as file transfer or internetwork messaging.

These different flow control mechanisms should not be confused with the generic flow control (GFC) field found in the ATM datastream. GFC is used to control end-to-end data flow, while these other tools are used to control the speed of switch-to-switch communications.

Waiting game

ATM switch interoperability is achieved today via the use of permanent virtual circuits. Interoperability using switched virtual circuits will not likely occur until 1995 at the earliest.

Users should drill potential switch providers for technical details that describe the actual congestion management mechanisms implemented within the switch as well as the vendor's track record regarding the percentage of cells lost in actual network operations. Both are important bits of information in determining the degree of effective performance one can realistically expect from a switch in actual implementation.

In one of the few independent ATM switch performance tests conducted to date, *Network World* Test Alliance partner the University of Colorado at Boulder found Fore Systems' ASX-200, General DataComm Industries, Inc.'s APEX-DV2, GTE's SPANet and Newbridge's 36150 performed as promised (*NW,* Aug. 22, page 43).

SWITCH MANAGEMENT

The tools provided to keep ATM switches in working order is obviously a fundamental purchase criterion. In addition to just keeping switches running, vendors must show how they can get those that fail back in operation quickly. End-user expectations regarding rapid restoration will likely be more pronounced in an ATM environment.

ATM today

Carriers such as Pacific Bell, Sprint, GTE Telephone and MFS Datanet are offering local and interexchange wide-area ATM services today at monthly rates ranging from about $5,000 to over $200,000.

Despite the need for good monitoring and restoration tools, the current state of network management for ATM today is limited at best to basic SNMP support, which is provided by almost all vendors for management of physical switch operation. There is little to any value-added functionality for effective management of end-to-end connections, however.

There are a few ATM management standards, but they are either just recently developed or in the draft stage. The UNI 3.0 specification contains the Interim Local Management Interface (ILMI), which specifies the use of SNMP and an associated Management Information Base (MIB) for managing the end station-to-switch interface. In addition, Bell Communications Research has taken the lead in defining an ATM MIB — called the AToM MIB — within the IETF. The AToM MIB is designed to supplement the ILMI and provide a more effective basis for managing both PVCs and SVCs.

Despite the progress made in getting the ILMI defined and the AToM MIB proposed, much work remains to be done, according to Roger Kosak of IBM, chairman of the ATM Forum's Network Management subworking group. "The Network Management subworking group has done an absolutely phenomenal job in hammering out the specifications, but there's still an awfully long way to go," he says.

Early ATM users agree. "Without a lot of direct vendor support, our pilot would not have gotten off the ground," says Bob Emmett, manager of network architecture at Hughes Business Communications, which supports Hughes Aircraft Co.'s internal network. "For every question we received an answer to, 10 more seemed to pop up. The vendors have really bent over backwards to make the system as a whole work, but network management support is about where you would expect it to be, given the state of the technology. Our advice to other users is don't try going it alone, at least not for a while."

The vendor with the most field experience in ATM network management to date is SynOptics with its Unix-based LattisCell ATM Network Management Application (NMA). Running on a stand-alone Sun workstation with links into SynOptics' Optivity, the LattisCell ATM NMA utilizes data maintained by a centralized CMS in order to provide a graphical rendering of network topology along with expanded statistical information at the port,

Continued on page 76

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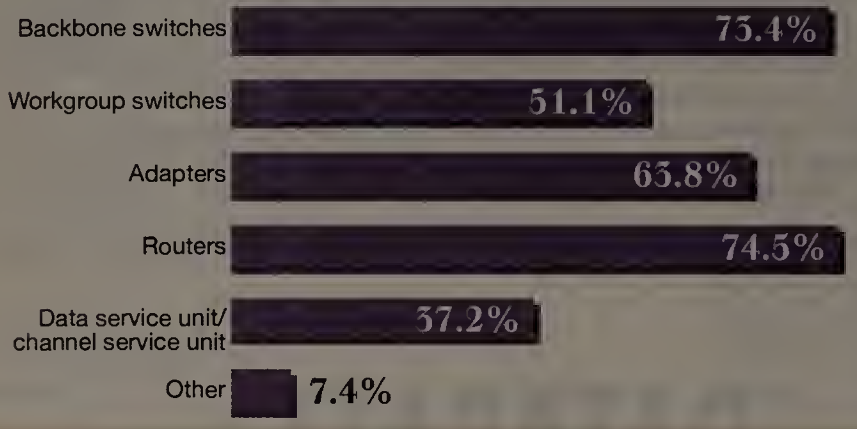
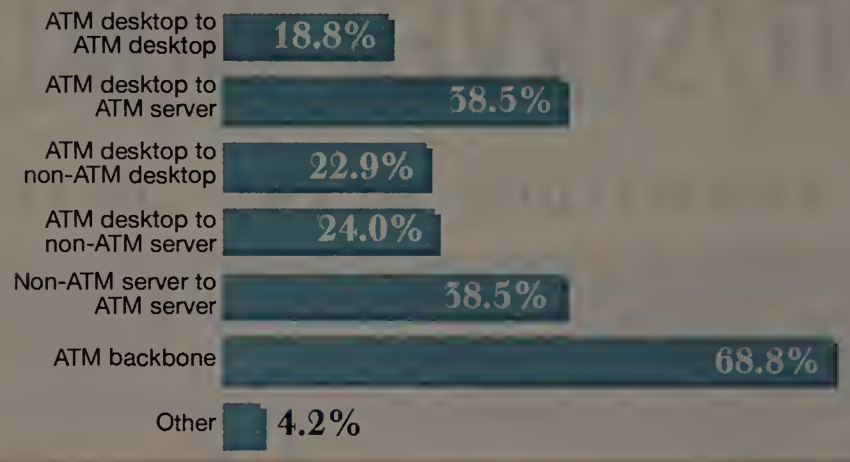
Reader views on ATM switches

Based on 100 interviews.

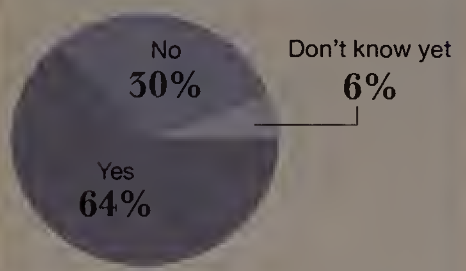
What types of ATM products will you evaluate in the next 12 months?
(Multiple responses allowed.)



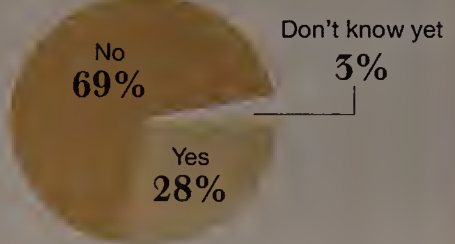
What is the scope of your planned ATM implementation?
(Multiple responses allowed.)



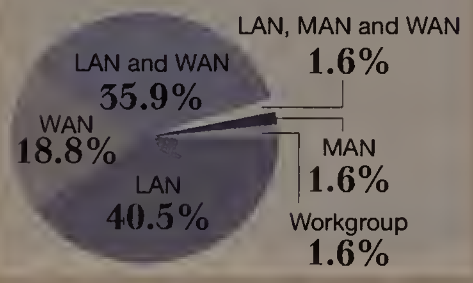
Will you be conducting an ATM pilot in the next 12 months?



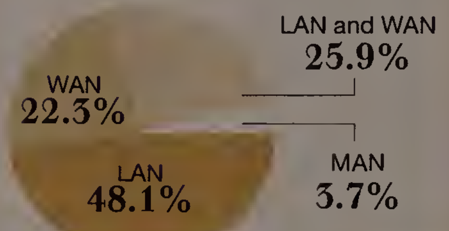
Will you put ATM into production in the next 12 months?



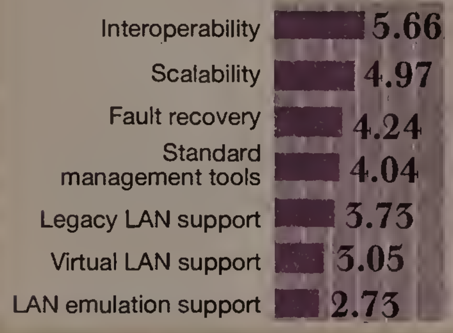
If yes, for which environments?



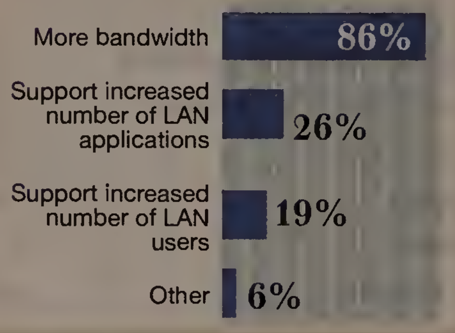
If yes, for which environments?



Which of these are most important in selecting an ATM product?
Based on highest possible score of 7.



What reasons compel you to move to ATM?
(Multiple responses allowed.)



Focus Data, Inc., an independent market research firm in Framingham, Mass., conducted the survey. Focus Data specializes in gathering primary data from end-user organizations regarding their enterprise network environment and needs. For more information on Focus Data services, call Mona Dabbon at (508) 626-2556.

Continued from page 75

switch and virtual call levels. The LattisCell ATM NMA has been available since the initial shipment of LattisCell Switch products.

LIGHTING THE ATM PILOT

Even with a lot of ATM switches in their infancy and so much more work for vendors to do, users aren't holding back. They are bringing early ATM switch products into pilot tests.

For the most part, the experimentation is undertaken as users accept the view that ATM's increased and dedicated bandwidth properties are the correct long-term solution for addressing the woes of existing LAN technologies. But users considering pilot or production deployment need to be aware that the projected life cycle of their purchases will be short, particularly given the rapid technology changes that will continue for some time.

ATM switch purchases today are six- to 12-month investments, not the typical three- to five-year strategic buys, says Wade Appelman, manager of product marketing at Cabletron. Consequently, many users may find themselves employing one set of hardware and software products for ATM pilot deployment, only to find that one or more of them will need to be replaced when it comes time for production implementation.

A 100M bit/sec Unix workstation ATM adapter from Fore Systems, Inc. cost $4,500 in the first quarter of 1993. A similar adapter from Connectware, Inc. to be shipped in the first quarter of 1995 is expected to cost $699, which is a huge decline in price.

In many cases, pilots will involve a combination of high-end desktops and servers connected via dedicated ATM circuits. For example, St. Mary Medical Center, a health care provider based in Long Beach, Calif., is currently evaluating ATM desktop and server technology as the basis of a high-speed extended LAN. This LAN will be utilized by both medical specialists and primary care physicians to share EKG and x-ray image data in order to make more timely decisions concerning patient hospitalization.

The pilot is part of the hospital's effort to keep costs down and speed the delivery of patient services, says Dennis Kotecki, chief information officer. "By creating a LAN infrastructure that provides a more effective decision support system for our medical staff, we plan to save both patients and insurers significant costs," he says. "These cost savings will result through just-in-time decision making, which can be moved closer to the source of medical expertise. Based on our capacity and growth requirements to create this infrastructure, we believe that ATM is clearly the correct technology choice."

However, advanced pilots such as St. Mary's do not represent the mainstream of today's internetworking usage. For ATM to become a significant market presence, most products will need to offer coexistence features between themselves and the enormous installed base of LAN equipment now in place.

Consequently, the nature of the typical ATM pilot is likely to change over the coming year. In some cases, the scenario will shift from one in which ATM is the only technology utilized between desktops and servers to one in which ATM end stations interwork with those on existing LAN segments. In other cases, ATM switches will be utilized as high-speed backbone transports to existing router-based networks. Alternatively, other ATM products may be used to provide direct conversion services for frames that originate on existing LANs to ATM cells, without the need for intervening routers.

Up to this point, the majority of pilots have involved either workgroup or enterprise ATM switches in a pure ATM desktop-to-ATM desktop or ATM desktop-to-ATM server evaluation.

However, given that a rapidly increasing number of users will deploy edge switches, it is highly likely that these products will play an increasingly key role in future pilot evaluations. This may introduce at least one more vendor into a pilot evaluation, not to mention the indirect introduction of existing hubs and routers whose traffic will be interfaced into the ATM backbone.

Despite the range of diversity and options available in today's embryonic ATM market, it is clear that the full promise of ATM technology as the universal networking paradigm will likely not occur until at least the latter part of this decade, if at all. At the same time, however, it is becoming increasingly clear that the components necessary to begin initial pilot evaluations and limited production rollouts are becoming available, provided one is willing to live without the presence of industrial strength net management for a few years.

The fastest growing segment of the ATM market over the next 12 to 18 months is expected to be the edge switch market. Strong user need for coexistence between ATM and existing LAN technologies, coupled with the rapid rise of switched LAN services as a stepping stone to a pure ATM environment, should result in strong demand for edge switches, provided that cost, interoperability and manageability are effectively addressed.

ATM testing

The majority of multivendor ATM switch testing is occurring in a combined LAN/WAN test bed, such as the North Carolina Information Highway Pilot. The University of Colorado – a *Network World* Test Alliance partner – is also performing ATM switch testing.

It is also likely that edge switch modules for existing intelligent hubs will become the preferred transitional path for many users as they seek to limit their technical and business risks. Increasingly, this will force many smaller vendors to differentiate themselves by offering leading-edge functionality, early standards implementation, superior price/performance or improved self-manageability.

Given the natural advantages of many of the larger providers, enhanced self-manageability could well constitute a more sustainable advantage and would be well received by many of today's already overloaded network managers.

➡Morency is a principal at Strategic Networks Consulting, Inc., a Rockland, Mass., firm specializing in internetwork planning and technology analysis. He can be reached via the Internet at 5754764@MCImail.com.

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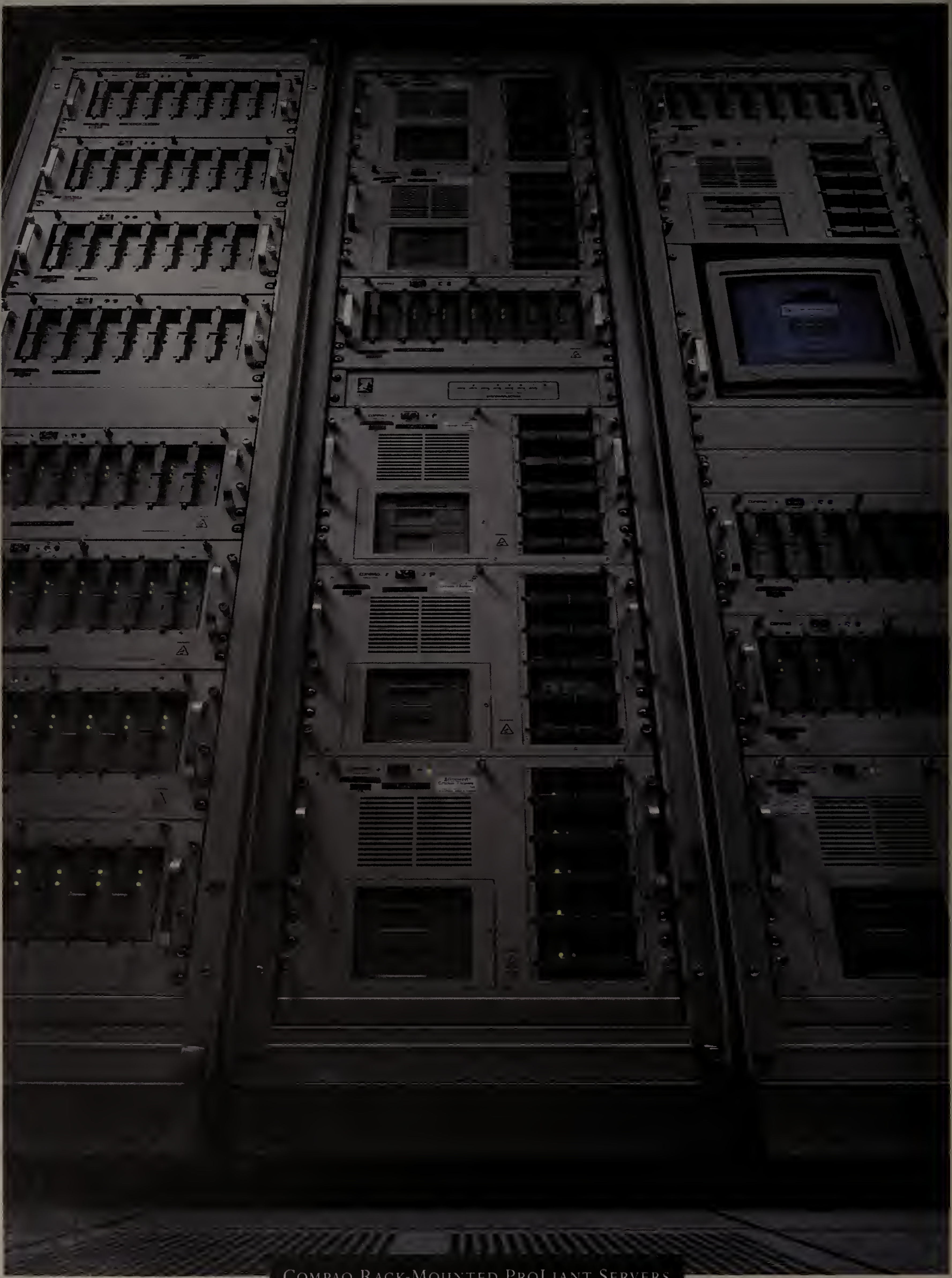

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Letters

Balance the sizzle

Although I am a Macintosh user, I have, nevertheless, been following the Microsoft Corp. antitrust saga (July 25, page 44). Not only does Microsoft supply PCs with DOS and Windows, but it supports the Macintosh through its software, most notably Excel and Word.

Both are excellent programs. Indeed, integration of applications with operating systems is good if the program features used are generalized and can be handled at a lower level.

Regarding its unfair business tactics, I think that Microsoft's competitors' use of the legal system to slow down Microsoft should be seen as a tactical move.

Destruction of Microsoft should not be the goal. The current outcome has bought some time for other operating systems vendors to get their act together.

IBM's OS/2 and Apple Computer, Inc.'s System 7 are both popular high-quality operating systems. In terms of 32-bit systems, both Apple and IBM are two to three years ahead of Microsoft.

Novell, Inc.'s NetWare, entrenched as an enterprise server network offering, has the dominant market position. And I haven't even mentioned Hewlett-Packard Co. or Digital Equipment Corp.

A focus on Microsoft alone is a myopic view. Indeed, it seems many in the trade press cater to the notion that only Microsoft counts and is important. I guess Microsoft is sexy. In journalists' hectic fever to say something, anything, to sell their journals and advertising space and fill a blank page — hey, I don't blame them.

Nevertheless, focus on sizzle, unbalanced biased presentation and unexamined assumptions in an article or editorial can lead unsophisticated users to false perceptions, and it is those types of articles that ultimately create conditions that are not in the best interests of business enterprise computing.

Paul White
Advertising manager
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Well done

I just wanted to tell you how much I loved Mark Gibbs' column on the religion of networking (Aug. 22). I always enjoy Gibbs' columns, but he outdid himself with this one.

Job well done!

Jackie Fox
Associate editor, public relations
Bozell Worldwide, Inc.
Omaha, Neb.

Religious zealot

I enjoyed Mark Gibbs' column on the religion of networking. Here's my $100 — please sign me up as a Priest of the Correct and Unalterable Way of Networking. Praise the microkernel!

I've scheduled the next sacrifice of a user's data files for All's Hallow Eve. I plan to erase them byte by byte and offer them up to Ray Noorda.

I draw the line at the whale idol, though. Unless it's the whale screen saver, which is OK.

Dave Bank
Regional LAN manager
North Carolina Department of Environment, Health and Natural Resources
Raleigh, N.C.

Help desk

Continued from page 2

effort is required for implementation. For more information about these systems, call Active Voice at (206) 441-4700, Centrigram at (408) 944-0250 and Octel at (408) 441-1144.

You might also want to consider a central office-based voice mail system, which might be available through your local exchange carrier. For a small office, this can be the most cost-effective solution because of the low start-up costs. However, monthly costs can be as high as $20 per mailbox.

I've heard that the state of Maryland is offering free Internet connections to anybody who has a modem. Do you have any information on this?

Thomas Gossard, Laurel, Md.

NW contacted Barbara Smith, project manager of Sailor, the Maryland library community project developed to provide Internet access to Maryland residents. She said that, by October, most Marylanders will have local access to the Sailor Gopher, which will provide subject-oriented menus offering a range of Maryland and Internet resources. Access to the Sailor server will be available via a number of routes, mainly through Maryland's local public library systems.

Also, if users have a microcomputer, modem, telecommunications software and access to a phone line, they will be able to dial into Sailor from their homes, offices and schools by dialing a local, toll-free number. There will be no charge for using the Sailor Gopher.

For information about Sailor, type gopher sailor.lib.md.us. From the main menu, select Option 1: Using Sailor, then Option 2: How to Use Sailor and finally Option 1: How do I get Sailor?

I have been trying to use Merit Network Inc.'s etherPPP, a public domain Point-to-Point Protocol for DOS, without success. Can you provide a technical support number for Merit?

Jeffrey Rosnick, Madison, Wis.

NW contacted a consultant at Merit Network, who said that etherPPP is available as is, without support. There are no plans to actively support etherPPP. The use of other PPP software, including commercially available packages, is strongly encouraged.

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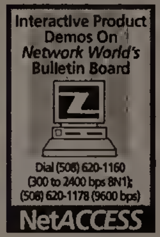

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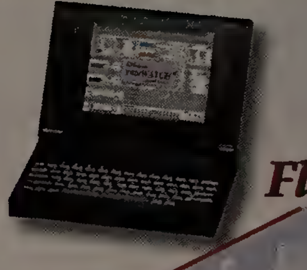

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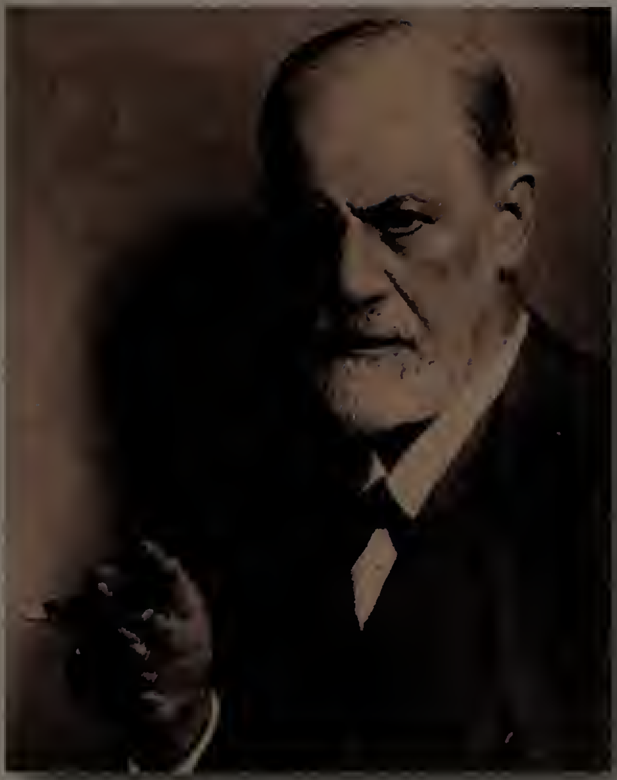

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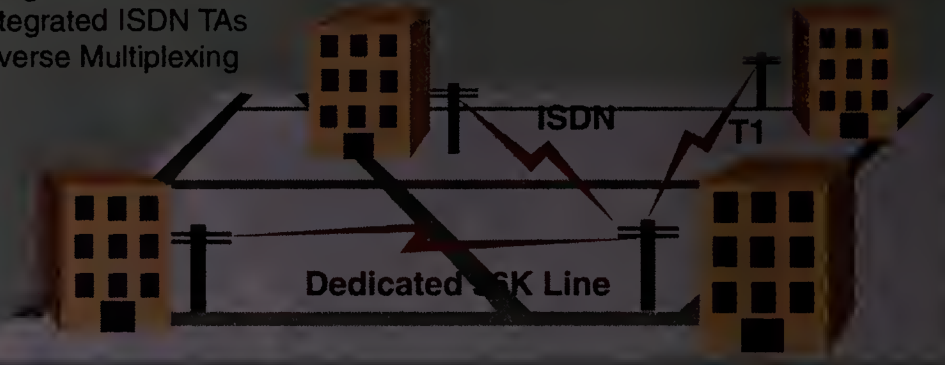

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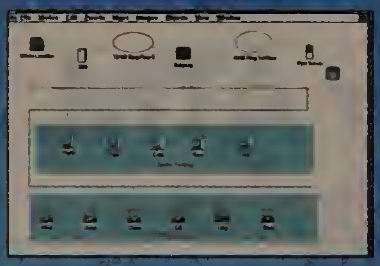
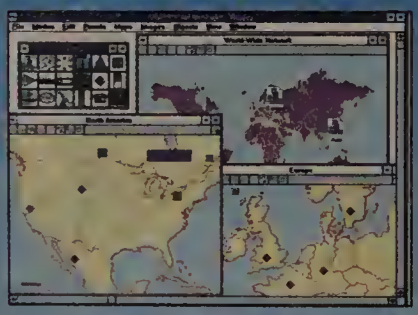


MANs – Plot cellular locations

WANs – Track and price circuits



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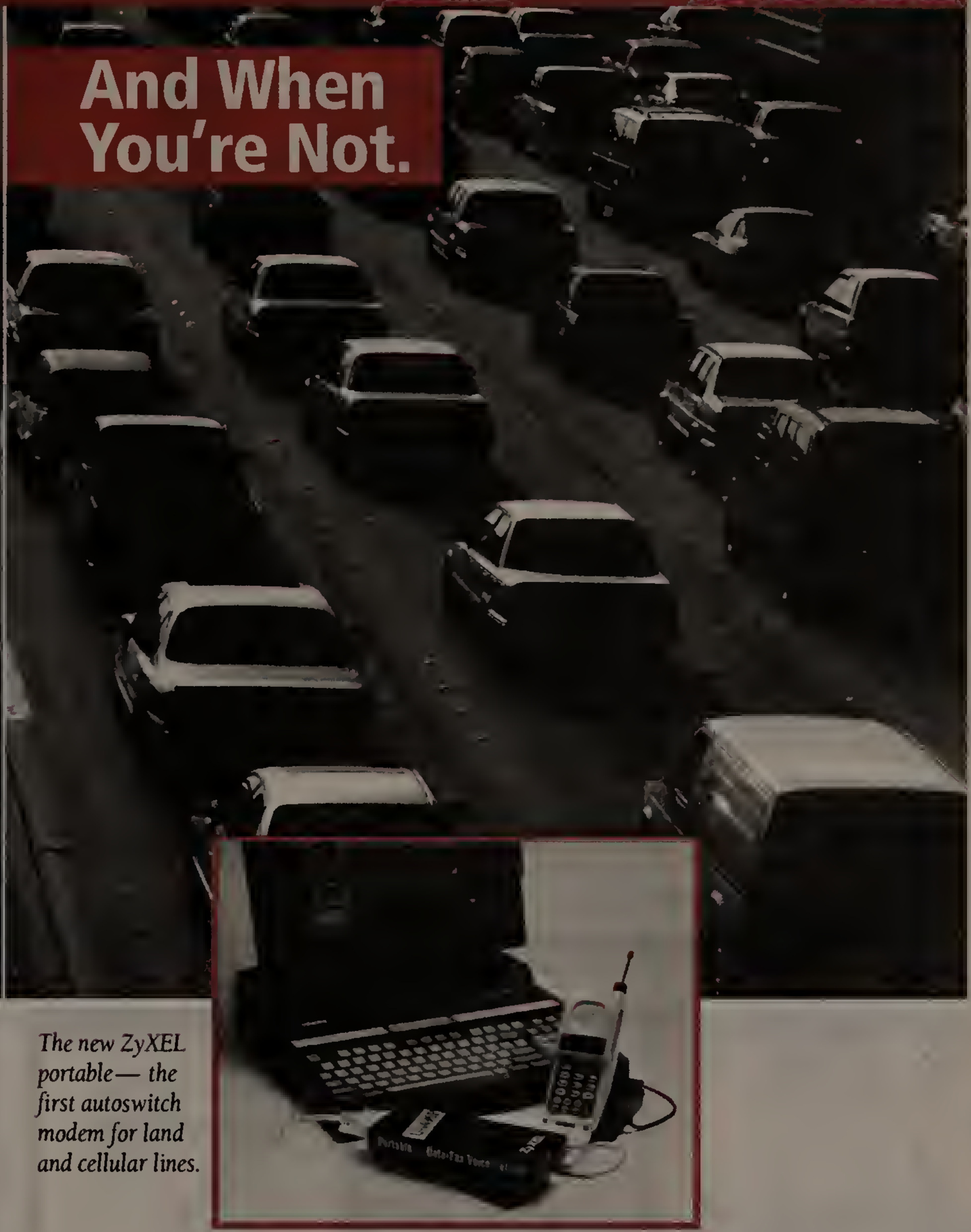

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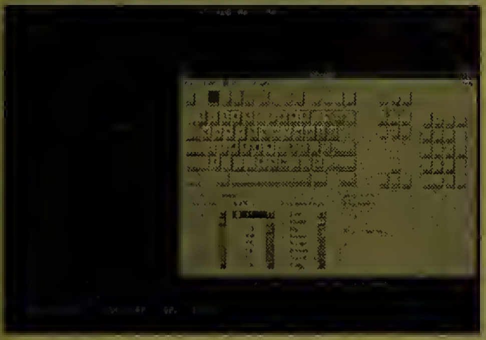

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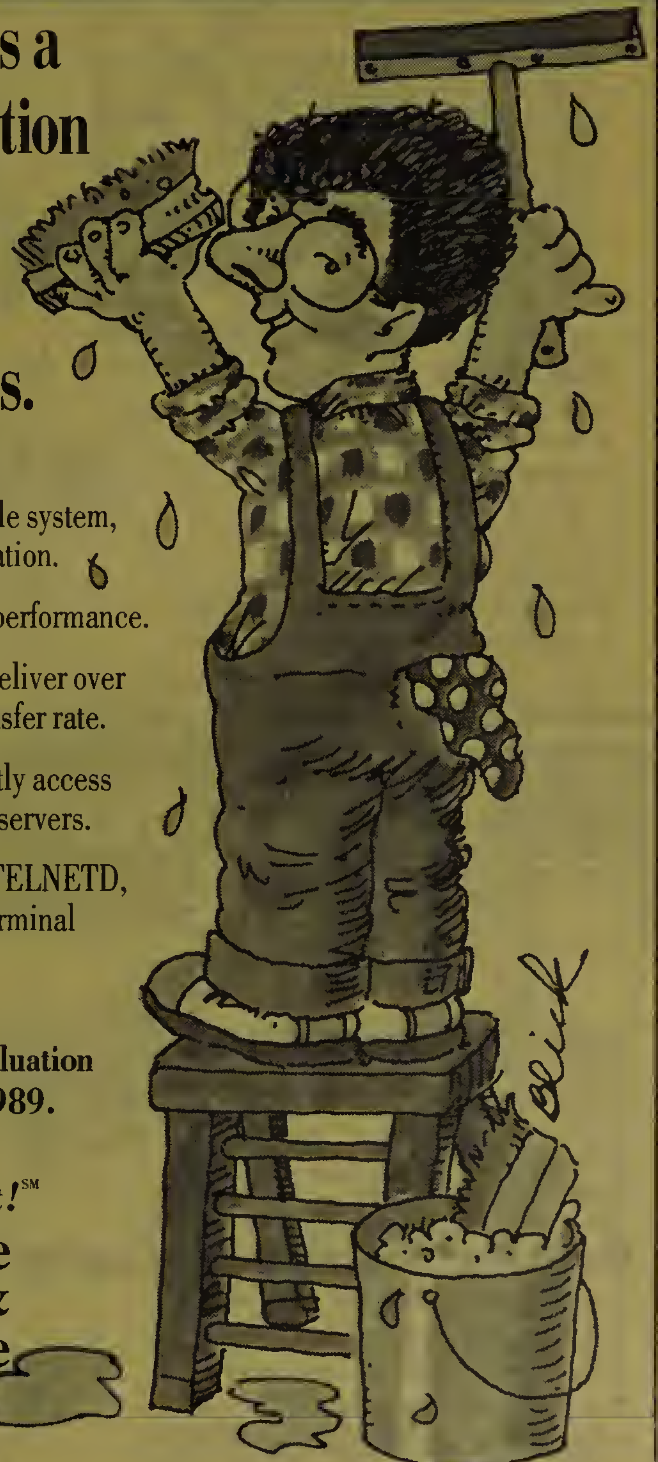

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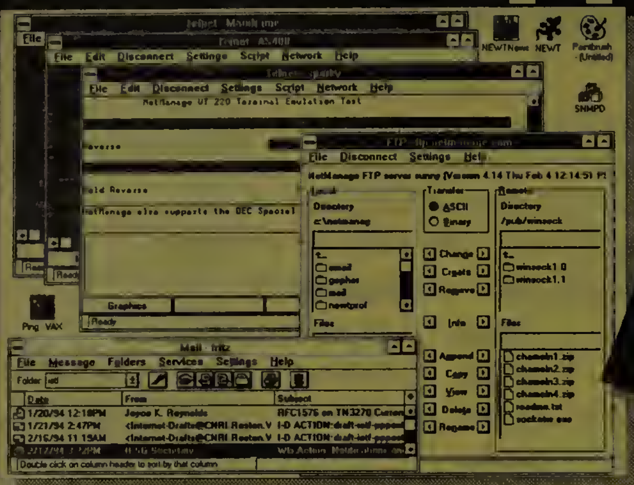

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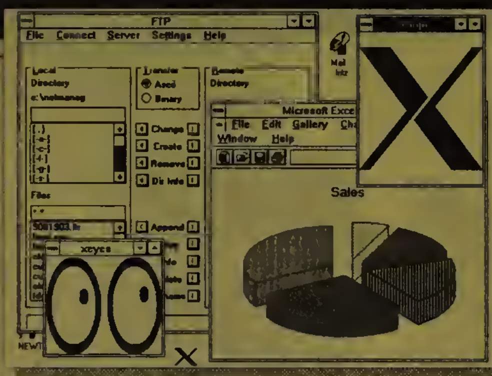

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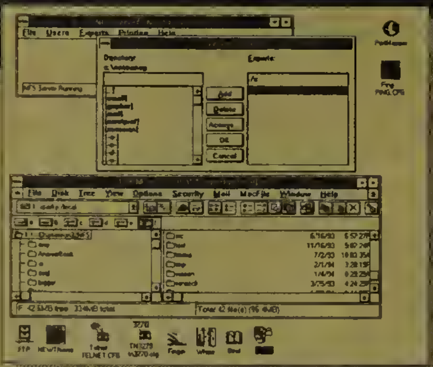

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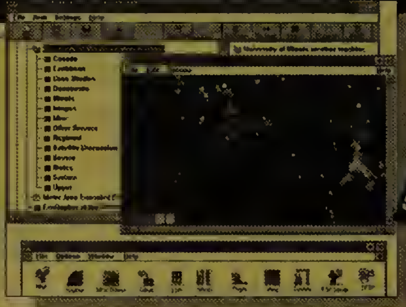

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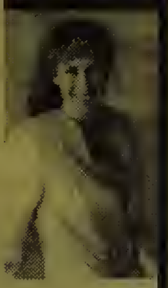

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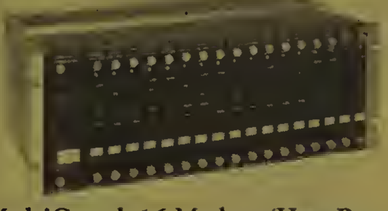

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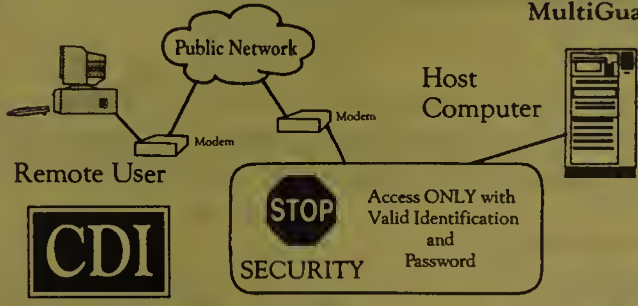

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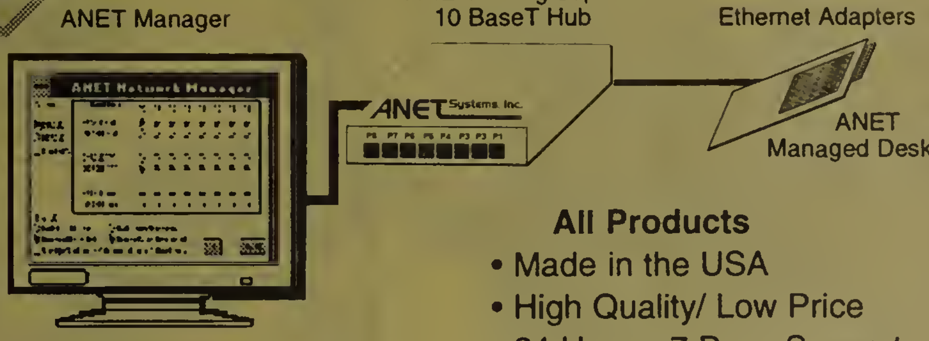

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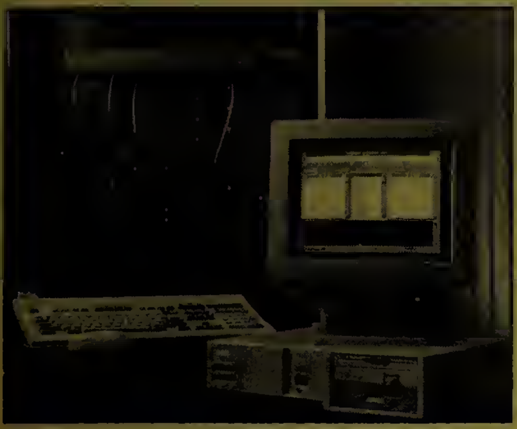

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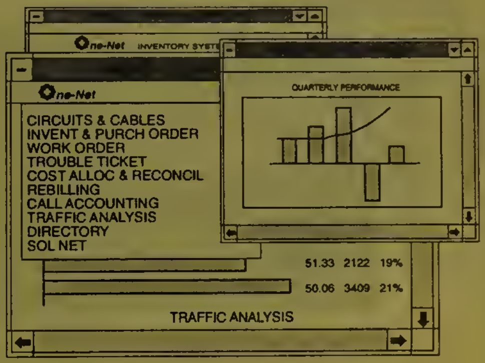

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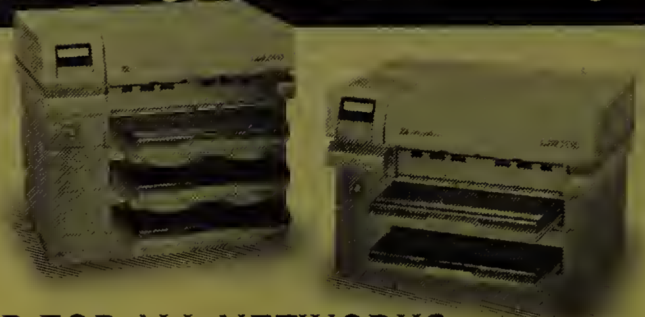

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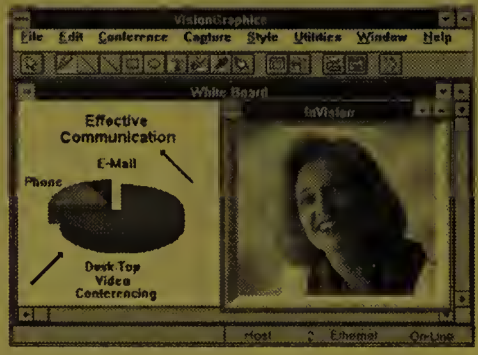

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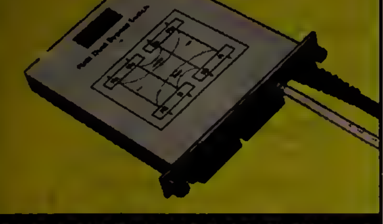

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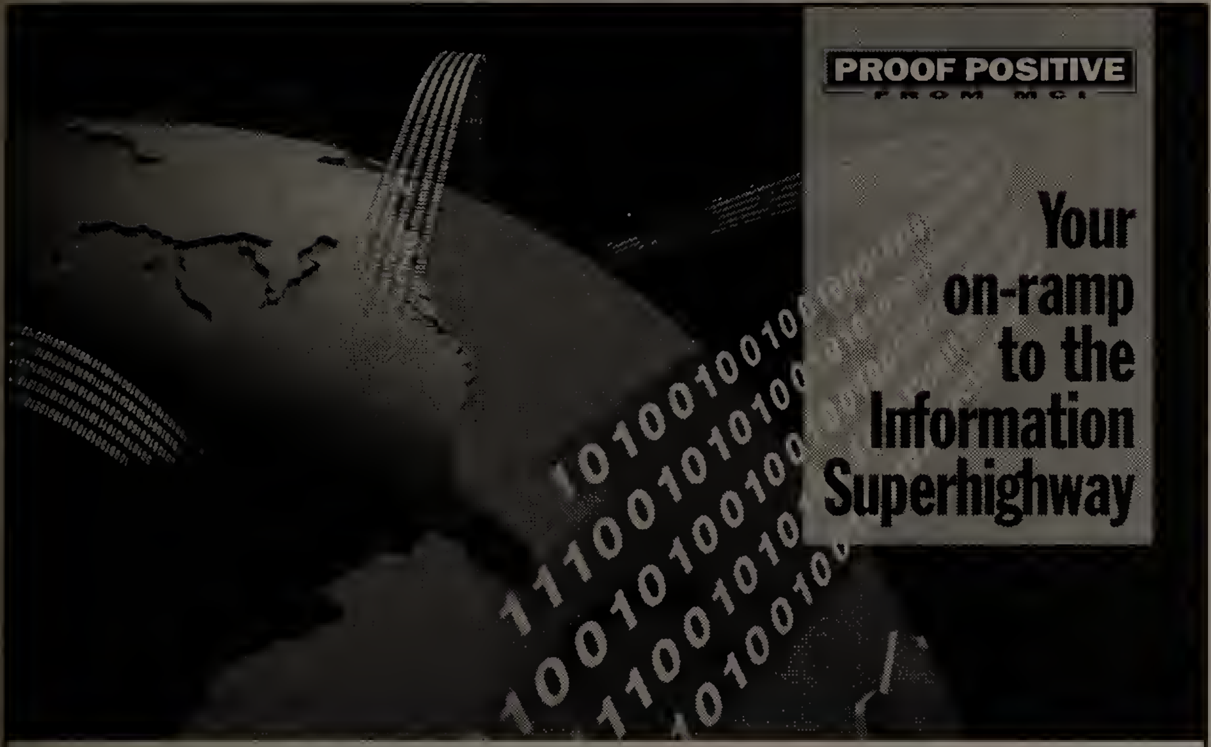
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Microsoft

Continued from page 1

and others are based.

According to a survey of 200 *Network World* readers conducted for this Reader Advocacy Force (RAF) series, 42% think Microsoft – like the IBM of old – has too much control over the setting of network standards. And 48% of those respondents are worried by that (see graphic, page 1).

"You're at their mercy. They have applications developers in their pocket, and you have to go along with them," one respondent said.

Microsoft *sets the* Standards

Only a third of respondents said users had enough input in the development of technologies such as OLE, ODBC and Messaging Application Programming Interface (MAPI).

GETTING INTO THE ACT

Microsoft users are eager to participate in establishing standards but said they're not always given a chance.

"Microsoft is 100% in control of developing its specifications, even if they do pay lip service to letting customers comment," said Steve York, senior manager of enterprise computing services at General Motors Hughes Electronics in Los Angeles.

Changes are made in specifications such as MAPI and OLE strictly to benefit Microsoft, not for any user benefit, he said.

Bryan Tsunoda, Microsoft Mail administrator for federally funded research and development center The Aerospace Corp., which uses Mail on about 3,000 personal computers and 2,000 Apple Computer, Inc. Macintoshes, agreed that users are left out.

"I have not known Microsoft to take any input from corporations with respect to which APIs to support," Tsunoda said. "It's usually 'my way or the highway,' OLE or nothing. It kind of hurts, especially since they seem to be discouraging people to use ODBC."

Microsoft tends to be more willing to take into account user wants when it comes to building applications, but even then it typically does so only for those products on which it makes the most money, Tsunoda said.

"Mail and Schedule + are way behind," he Tsunoda said.

The specifications would be stronger and users would be happier if there was a formal user review and comment period with Microsoft specs as there is with specifications developed for the Internet, York said.

Protocols such as TCP/IP were developed and demonstrated, then made available on the Internet so potential users could test and comment on them. This process resulted in usable, reliable technology, York said.

A similar process, in which Microsoft users could test and offer ideas to tweak Microsoft's APIs before they are released, would also result in more reliable technology that is suited to what users need, York said.

Overall, Microsoft is fairly open to input from users and other vendors, but it should license technologies such as OLE to other software developers, said Keith Johnson, systems analyst at Becton Dickson Research, Inc. in Research Triangle Park, N.C.

Doug Henrich, director for the developer relations group at Microsoft, said the company does get input from users, mainly through independent software vendors, which get feedback from their customers and pass that on to Microsoft. But Microsoft does keep control of the process, he acknowledged.

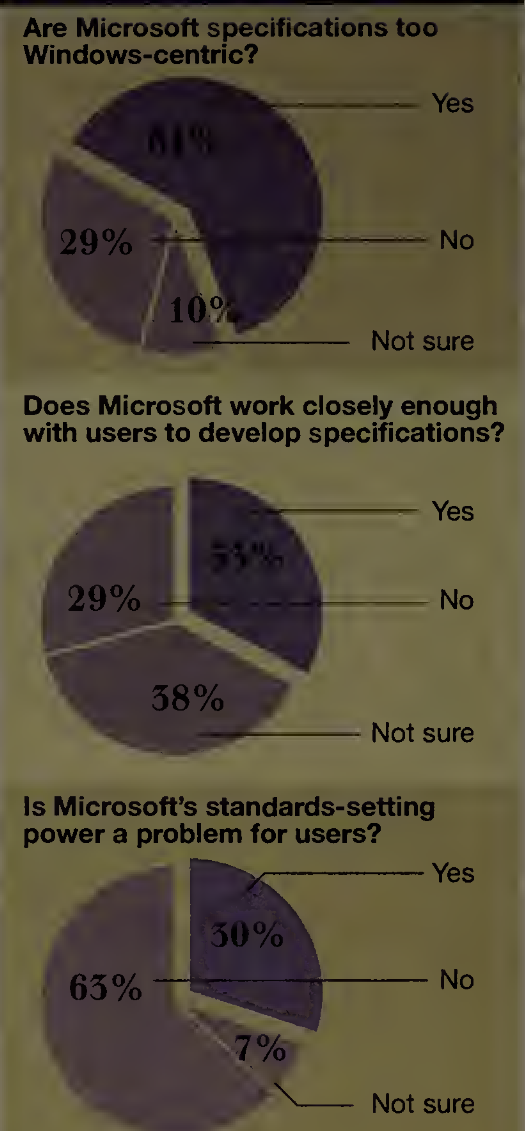
The rapid spread of new standards from Microsoft and their quick adoption in applications from Microsoft and other vendors, may lead users down Redmond Road unwillingly.

Bob Stratton, a technical advisor at Gulf Canada Resources in Calgary, Alberta, just signed a site license for 1,200 copies of Microsoft Office even though he thinks some of the products in the suite aren't the best in their class. The superior implementation of OLE in the integrated package prevented Stratton from going with Software Publishing Corp.'s Harvard Graphics and Lotus Development Corp. AmiPro, which he said are otherwise superior to the similar Microsoft applications in the suite.

"You're pushed into buying Microsoft products to take advantage of things like OLE and [Dynamic Data Exchange]. Microsoft is trying to get an edge, and that might be a problem later on if other applications don't conform to its specs," Johnson said.

Microsoft denied that it exploits its own standards development process to get an edge in the market.

How Microsoft "standards" affect users


Are Microsoft specifications too Windows-centric?

Does Microsoft work closely enough with users to develop specifications?

Is Microsoft's standards-setting power a problem for users?

Based on a survey of 200 users.

GRAPHIC BY SUSAN J. CHAMPENY

Focus Data, Inc., an independent market research firm based in Framingham, Mass., conducted this research. For more information, contact Mona Dabbon at (508) 626-2556.

"Our only advantage is that we make a strong early commitment to these specs, whereas some other companies want to think about it for a longer period of time. Bill Gates stood up and made a commitment to OLE, whereas the others waffled a little bit," said Dave Seres, group product manager for OLE at Microsoft.

Another chief concern among users is that Microsoft standards tend to be Windows-centric. More than half of those surveyed – 57% – said Microsoft's de facto standards are too reliant on Windows. What's more, 48% of users foresee themselves standardizing on one set of networking specs for Windows systems and another for non-Windows machines.

"There's no doubt at all that their specifications have a Windows-centric approach and that they don't want to have anything to do with certain operating systems like OS/2," York said.

Microsoft should make cross-platform implementations available at the same time as their Windows counterparts, users said. These should include not only those platforms such as the Macintosh where Microsoft sells large amounts of application software, but also platforms such as OS/2.

"There are some things that don't run best on a PC," said Bob Halloran, network engineer at AT&T Universal Card Services in Jacksonville, Fla. "Windows is a multitasking piece running on top of a single-threading operating system. The development front ends like Visual Basic are real pretty, but for the real down and dirty [application development] stuff you need a full-featured multitasking-from-the-get-go operating system underneath."

Randy Dugger, associate director of information systems for biotech firm Liposome Technology, Inc., which has a mixed Windows and Macintosh net, praised Microsoft for the breadth of its support.

Microsoft has done more than competitors like Lotus to make applications and APIs available on platforms other than Windows, he said.

Microsoft is expected to release a software development kit for ODBC on the Macintosh later this year and has plans to port OLE to several other platforms.

STANDARDS ISSUES

Of even greater concern to users than cross-platform support is interoperability with competing standards.

More than two-thirds of users surveyed said Microsoft should hand its standards over to standards bodies to administer. But two-thirds also said that their needs are better met when Microsoft develops and distributes a technology as a standard quickly, instead of waiting for a standards body to deliver a specification.

"Everyone wants to do their own [standard] when users are really looking for just one," Dugger said. "Think if this happened in the car industry. We'd have cars with steering wheels on different sides, and the gas and brake pedals in different combinations."

Microsoft has stated its intentions to support Distributed Computing Environment and to form links between OLE and the Object Management Group's CORBA standard, as well as to support X.400 and Simple Mail Transfer Protocol in its Exchange messaging product. All these directions are indications that Microsoft recognizes the need and the market opportunity represented in specifications that are open, York said.

"They're moving in that direction, and I think it's because they recognize that those standards are strong standards that they'll eventually be forced to support anyway," he said.

RAF RECOMMENDATIONS

In general, the survey shows that a large percentage of *Network World* readers are uncomfortable with Microsoft's power and are concerned that it will hurt their ability to build and support flexible heterogeneous networks.

Microsoft has to come up with a more open process for letting users have input early on in specification development. While some users won't take advantage of such an opportunity, it seems that many would like to have the option. Even if Microsoft has such programs in place now, it's obvious that many users aren't aware of them.

Finally, users need Microsoft to create specs from the start that are more inclusive of non-Windows applications and platforms. This will require Microsoft to be more willing to reach compromises with other vendors and to be more of a leader within industry standards groups, rather than watching from the sidelines until the time is right from its own perspective to join. ◻

Microsoft to target BackOffice

Microsoft Corp. this week will apply several of its successful desktop marketing strategies to the network by announcing a bundle of server products and a competitive upgrade aimed at Novell, Inc.

BackOffice will bundle Windows NT Server 3.5, SQL Server 4.21a, SNA Server 2.1 and Systems Management Server (SMS) – all of which will be announced or shipped this week – as well as Microsoft Mail (which will later be replaced by Exchange Server).

BackOffice will cost $2,200 per server and $300 per client, compared to about $4,500 if the products were bought separately. The package will not be available until at least October.

The competitive upgrade offers NetWare customers Windows NT Server 3.5, code-named Daytona, at half the cost of upgrading NetWare. However, it may not be such a sweet deal, suggested Glenn Fund, president of the Greater Boston Area Novell Users' Group.

"The cost of the upgrade is the most minor part of the process," he said. "The incompatibilities of going between different versions of NetWare are significant enough. Going to anything else multiplies the risk."

Neither is there a clear benefit to the bundle, said Joe Weber, manager of research and development information systems for a large chemical company. Large users want desktop suites for clients because standardized suites are easier to manage in large numbers, but server operations are more specialized and need best-of-breed software, he said.

BY KEVIN FOGARTY
AND PEGGY WATT

Got a problem?

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ProShare

Continued from page 4

Conferencing Work Group specification in its network as a gateway service provided by AT&T WorldWorx Solutions. "We'll be demonstrating this in December," Luekenoff said.

PROSHARE FOR LANS

Intel's ProShare LAN-based video system, slated for release by year end, will not be based on the Personal Conferencing Work Group specification, however. "Support for the Personal Conferencing Work Group spec will come in about a year," Intel sources said.

The LAN-based Intel ProShare system will be nearly identical to the InVision product, according to sources. Like InVision's system, the Windows-based ProShare video will deliver sound and images across TCP/IP local- or wide-area links. But the InVision and Intel products will not interoperate.

Like InVision's system, the Windows-based ProShare video will deliver sound and images across TCP/IP local- or wide-area links. But the InVision and Intel products won't interoperate.

Intel's LAN-based product will work with ProShare's data-sharing software, known as ProShare Premium, which already works on both the local- and wide-area basis.

Intel will offer a free upgrade for customers of ProShare Video System 200, which works over ISDN Basic Rate Interface, to the LAN-based videoconferencing system.

Intel's LAN system is in beta test at businesses that include NationsBanc CRT and Hughes Aircraft Co.

Hughes Aircraft has a 29-node network of H.320-based videoconferencing room systems but is looking into desktop videoconferencing with data-sharing primarily for the benefit of engineers needing to collaborate remotely.

"We'll be testing the Intel ProShare LAN video over Asynchronous Transfer Mode between our locations at Fullerton and El Segundo, Calif.," said Dave Horn, video systems specialist at Hughes Aircraft.

Horn said he hoped the Personal Conferencing Work Group presents a de facto standard for getting LAN-based videoconferencing systems to interoperate with H.320.

"This is important because we have an installed base of H.320 room systems we would like to be able to use in conjunction with desktop video systems," Horn said.

Oracle

Continued from page 4

because it would let you do intelligent routing of forms, E-mail and workflow."

Along with Oracle Documents, the company will also announce Cooperative Development Environment (CDE) Version 4.5, which will include a revamped user interface, object-oriented programming capabilities, tighter integration to Oracle7 databases and the ability to link to transaction processing monitors.

Introduced in 1993, CDE is an integrated set of products for developing client/server applications. It includes Oracle CASE Designer, Oracle Forms, and several other components for designing and building applications.

CASE Designer, which has a reputation for being visually unappealing and difficult to learn, has been revamped for easier usage. The new CASE Designer was described by beta testers as similar to Microsoft Corp. Visual Basic. Also new to CDE 4.5 is support for reusable code, or objects, that may be stored in a CDE repository.

REPACKAGING CDE

CDE will also be repackaged. Products that are sold today by functionality (such as Oracle CASE Designer and Oracle CASE Dictionary) will be packaged for different user needs, such as tools for analysts and designers.

Analysts said that may save users money. With the old packaging, customers often wound up buying functionality they did not want.

Oracle is expected to ship the CDE products in the first quarter of 1995. Sources said all CDE 4.5 components will be available on Windows.

Analysts said CDE has a reputation for lacking a flashy face but has been useful in building client/server applications, and the changes would make CDE even more attractive.

Digital

Continued from page 6

tional tool for Internet access; run-time versions of the Open Software Foundation, Inc.'s (OSF) Distributed Computing Environment (DCE) and Digital's ObjectBroker and DECmessageQ middleware; and Digital's RoamAbout Mobile IP for wireless network access.

These were previously separately priced products. Version 5.1 also includes Digital's InfoBroker client software, which allows Pathworks users to browse an InfoBroker directory server or an X.500 directory for user and resource location.

Hutchinson is running OSF's DCE through its paces and is waiting for delivery of Pathworks 5.1. "We are a big Pathworks site, so it's on the list," he said.

Other Pathworks sites, reflecting on Digital's sinking financial fortunes, could care less about Version 5.1.

"Digital, as a company, as a software provider, is going to go away," said Larry Thomas, systems manager at Florida Atlantic University in Boca Raton. For this reason, Thomas is replacing Pathworks servers with NetWare machines.

Pathworks 5.1 costs $175 per client and is available now.

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Lotus

Continued from page 5

want to slowly bring Notes to other departments. Notes Express will come with a built-in software switch that will let a Notes administrator upgrade Express clients to full-fledged Notes from a single console.

Pricing starts at $159 a license for as many as 99 seats, and $99 per copy for purchases of 100 or more licenses. The clients require a Notes server, which lists for $495 a copy.

Reaction to Express was mixed.

Gary Lasko, senior vice president and director of IT at Sedgwick, Inc., in Memphis, Tenn., said the product will let his company roll out Notes and gain familiarity with it at a lower price. As the company begins to develop more advanced applications, it can buy full-fledged Notes for those employees who need them, he said.

"Personally, I'm disappointed," said Thomas Griffith, systems officer for Northern Trust Co. in Chicago. Griffith said a run-time version would let him build applications for end users who have little or no need for the macros and other programming tools that now come with every copy of Notes.

Mike Rothman, analyst for META Group, Inc. in Reston, Va., said Lotus is squandering an opportunity to get Notes on more desktops before Microsoft releases its Exchange messaging server. Rothman said Lotus should be doing everything it can to make Notes a ubiquitous platform before Exchange ships in 1995 or even 1996.

"They just don't get it," he said.

SOFTSWITCH

Lotus also said last week that by mid-1995 it will role out a new version of its SoftSwitch Central messaging switch, used for transferring E-mail among disparate E-mail systems, that will add greater support for file attachments, improved management tools and greater processing speed.

SoftSwitch Central, Version 4.4, will translate outbound-attached files into E-mail messages for systems that cannot accept attachments.

Lotus officials added that they have no efforts underway to port their EMX Unix messaging switch from the current Data General Corp. AViiON platform.

Bank

Continued from page 1

"This was a reengineering process; it wasn't a traditional pave-the-cow-path [automation project]. They were reengineering as they were developing."

-Doug Switzer

given almost free rein to reengineer the division's processes, but was charged with delivering working systems models quickly.

The team was also instructed to keep the implementation as simple as possible, as well as to use the bank's existing network and other systems without too much modification.

The team came up with a system based on imaging and workflow technology from Filenet Corp., but featuring mainly custom applications built by the bank. The applications run on IBM RISC System/6000 servers running AIX, with Windows clients linked locally by Novell, Inc.'s NetWare and across the WAN via TCP/IP on the same dedicated net the bank uses for its other business.

The WAN links the Asian division to the bank's central data processing facility outside of London, from which international customers place transaction orders for the Asia division.

Two main document processing and administrative sites here are linked to the London center. They receive new transactions as scanned documents from London or scan them in from local customers and route the documents automatically to remote sites across Asia. The Hong Kong sites also automatically fax notices to Asian customers when they clear a transaction and route them to local branches for execution.

GO TEAM!

The system development process involved more than systems integration and writing code, Switzer said. The 24-person team that organized and built the system were given a course in reengineering and told to revamp any part of the process they thought should be changed to make it more efficient, Switzer said.

While they were rolling out the system, the team called in help from the bank's IS staff for help configuring routers, doubling data communications line capacity, and in adapting workstations and LANs to handle the new applications, Switzer said.

He picked his team from several Asian countries and from all the departments that would use the system. The coding was done by five retrained COBOL programmers already employed at the bank, who worked closely with other team members. After a week-long course in business-process reengineering, Switzer turned the team loose.

The bank picked the most paper-intensive operations for automation first, and those with the fastest rising costs to automate. Switzer encouraged team members to act as "quality police" and to feel they owned the processes they were designing.

Key to the development's success was the Asia division head's commitment to reengineering and to spend enough money to do it right.

Key to the development's success was the Asia division head's commitment to reengineering and to spend enough money to do it right, Switzer said.

The team committed to coming up with a major implementation every 90 days, Switzer said.

Although delivery times slipped to about 120 days, the team is still delivering new versions regularly. They also committed to shelve for future versions any function that would take more than 90 days to deliver.

The third commitment was to break existing bank procedure rules whenever the team found a more efficient way to do things.

"There was a lot of that," Switzer said. "This wasn't a traditional pave-the-cow-path [automation project]. They were reengineering as they were developing."

Comments?

See "Contacts" box on page 2.

Object technology at the plant

IBM is not only using its object-oriented technology to build net management systems; it's also using it to help build the Information Superhighway.

The U.S. government last week awarded a consortium of vendors led by IBM with a $60 million contract to develop software tools that will help manufacturing firms across the country develop distributed object-oriented applications that will run on multivendor computing platforms.

The tools will utilize IBM's object-oriented Distributed System Object Model and System Object Model technology, which promises to make it easier for organizations of any size to develop applications that can share information and communicate no matter what the underlying network protocol might be.

The contract, signed with the Department of Defense, calls for the development of National Industrial Information Infrastructure Protocols. The protocols are seen by the Defense Department's ARPA as a fundamental building block of the National Information Infrastructure, also known as the Information Superhighway.

The object-oriented applications are destined to be the central link between defense and commercial industries, where future products and services will be developed that could have dual military and commercial roles.

IBM will oversee system design, development and integration as well as the establishment of commercial channels for delivery of the project's software products, which are expected to appear by 1998. Digital Equipment Corp., the University of Florida and a handful of other organizations also belong to the consortium.

BY MICHAEL COONEY

Karat mgmt.

Continued from page 1

DSOM into its management products (*NW*, May 30, page 7), but last week was the first time it mentioned Karat and sketched out a detailed plan.

In its first incarnation, Karat will include such object-based facilities as a data management program that will let users initiate data backup and recovery, said John Byzek director of IBM's enterprise management applications and solutions group. It will also include work load management features, topology discovery, and alert and problem tracking capabilities.

WALTER CALAHAN

WARNER

"Existing applications will be migrated to operate with Karat over time, but our focus initially will be new applications designed to exploit Karat and object-oriented technology," Byzek said.

Using SOM- or CORBA-compliant interfaces, users or third-party vendors will be able to build objects on top of Karat that define how to manage their particular devices or resources, he said.

Karat is also expected to tie the object-oriented work IBM has already begun with its NetView/390 and NetView/6000 platforms. For example, IBM executives said NetView's Resource Object Data Manager database would become an accessible object from Karat, giving the Karat user access to any Systems Network Architecture or LAN resources being controlled by NetView.

IBM's other network management tools, such as NetView for OS/2 and LAN Network Manager, would become Karat objects, too. That would let users manage almost any net device from one console and make it easier to implement a distributed management strategy.

Karat will first be available on IBM's AIX platform, then OS/2 and Application System/400 systems, Byzek said. A beta version of Karat for AIX is expected to be available by October.

Most analysts think IBM will be more successful with Karat than with other past wide-ranging strategies.

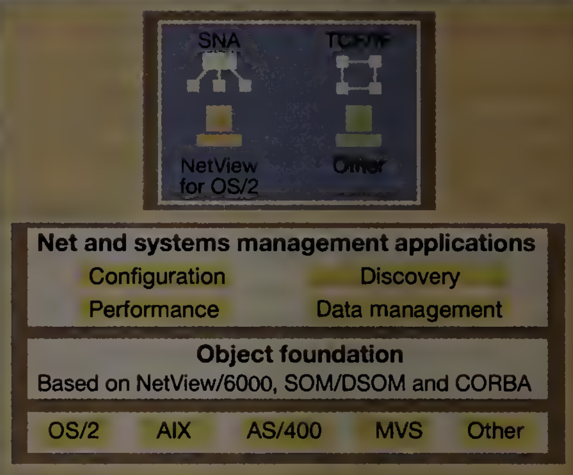
They said IBM has the tools to get in front of competitors such as Hewlett-Packard Co. and Microsoft Corp., who are also fighting for the leadership role in the object-oriented distributed system management race.

"Karat is among the technologies that will lead the third wave of net and systems management products," said Atul Kapoor, a principal with the Kaptronix, Inc. consultancy based in Haworth, N.J. "The first wave was proprietary systems like NetView, and the second was SNMP-based platforms like HP's OpenView."

IBM needs to roll out Karat in a deliberate fashion and avoid the smoke-and-mirrors act it often displayed with other grand management plans, such as SystemView, he added.

"We are always looking for ways to better integrate and manage a wide array of multivendor systems," said Jason Comstock, a product specialist with CompuServe, Inc. in Columbus, Ohio. "We like the direction IBM is trying to go with Karat because it sounds like it could bring everything we manage under one umbrella; but we need more details before we can commit to it."

The object is management



IBM's new object-oriented enterprise management platform, code-named Karat, will provide a single point of control over a multitude of management applications and platforms.

GRAPHIC BY SUSAN SLATER

Bay

Continued from page 1

assure people the deal is still on track.

Rivals were predictably skeptical about the strategy, but users expressed some optimism about Bay Networks' broad goal of developing an ATM switch/router to anchor enterprise nets, as well as a line of integrated hub/routers for the remote access market.

"The merger represents a potential reduction in the complexity of purchasing technology and integrating it," said Nick Beard, director of information systems at Healthcare International in Glasgow, Scotland.

JOHN COLLETTI

SEVERINO

Paul Severino, who will serve as chairman of the board of the newly merged company, said the company's goal is to integrate routing with switching and provide the tools needed to manage new Asynchronous Transfer Mode nets.

Bay Networks' plan calls for "the development of a product that sits on top of an existing net and provides access to emerging ATM nets, tying everything together," he said. This ATM switch/router, which the firms dubbed "the new shiny thing," will act as an enterprise backbone device, integrating ATM nets with LAN/WAN environments that contain shared and switched segments.

The switch, which is expected to become available in the next 18 to 24 months, will allow users to build enterprisewide virtual LANs and route traffic between those segments as necessary.

"If a user wants to run LANs over ATM, they have two options," Severino said. "They can route at the net edge and forward traffic through an ATM switch like Cisco [Systems, Inc.'s] CiscoFusion. But that involves proprietary interfaces and new gear. Or they can go with a virtual network router architecture that provides open, standard interfaces and uses existing wiring closet gear."

John Morgridge, Cisco's president and chief executive officer, disputed that.

"We've always tried to accommodate our customers by embracing anything they've asked for, and CiscoFusion is no different because it is not a closed environment," he said. "SynOptics and Wellfleet may also be jumping ahead. Major mergers involving major firms are painful, especially when they've had little experience with one another and are so geographically dispersed."

Analysts worry that SynOptics and Wellfleet may alienate Cisco users, who make up the vast majority of internetworking purchasers. But that isn't necessarily so, according to one customer of SynOptics and Cisco.

"Synergy is the important thing; it doesn't matter who I buy a router from," said David Lockhart, director of systems integration at Toys R Us, Inc. in Rochelle Park, N.J. "I wish [SynOptics merged with] Cisco, but I now have a hub vendor with more router expertise."

Mark Oliveira, a SynOptics and Cisco user and manager of net planning and design at Nabisco Foods Group in Parsippany, N.J., agreed. "CiscoFusion is aggressive, but it's a different push," he said. "We're focused on maintaining investments, and SynOptics carries [investment protection] a bit further than Cisco.

"Applications are surfacing that require the speed and power of switched networks and ATM, but today's solutions are either proprietary or cost-prohibitive," he said. "I want an open architecture with standards, something that complements my existing base, strong service and support, interoperability of ATM products with existing routers, and switched Ethernet and token rings."

In addition to the enterprise backbone, Bay Networks will continue to develop routing, switching and hubbing products for the backbone and data center, as well as the remote access market.

Within 90 days of achieving final shareholder approval (see graphic), Bay Networks will roll out products designed to give remote sites access to resources on a central LAN. The combined hub/routers will include a data service unit/channel service unit and offer a variety of bandwidth management features.

"Unless large firms merge or tightly interact, you won't see the required technologies for new nets until the year 2000," said Jefff Marshall, managing director at Bear Stearns & Comapny, Inc.

ODS moves to align itself with Cisco

Let the games begin.

The proposed merger of SynOptics Communications, Inc. and Wellfleet Communications, Inc. has prompted hub maker Optical Data Systems, Inc. (ODS) to begin distancing itself from Wellfleet and moving closer to Cisco Systems, Inc.

ODS last week at NetWorld+Interop here underscored its decision to embrace Cisco as its strategic router partner by displaying several new hub modules for its Infinity hub line that are based on Cisco offerings.

"You won't see any Wellfleet equipment in our booth this year because they have apparently chosen to work against us, not with us," said Terry Gaston, ODS' vice president of marketing. "You can read that as ODS stepping closer to Cisco."

ODS currently carries a full line of integrated Wellfleet routing modules for its hub, as well as routers from both Cisco and Network Systems Corp.

ODS last week introduced the Infinity 1094-CS16, a modular form of Cisco's 16-port Asynchronous Transfer Mode switch — dubbed HyperSwitch A100 — that will take up five slots in the Infinity hub. ODS currently supports ATM switches from Newbridge Networks, Inc. and Fore Systems, Inc.

The module, to be available in October, will cost a little more than Cisco's list price, which starts at $21,900.

Also, contrary to other reports, Cabletron Systems, Inc. will not be the first vendor to integrate Cisco's recently announced 4500 router into its hub. ODS had a three-slot 4500 hub module on display at its booth last week. According to Gaston, the module is available now.

©ODS: (214) 234-6400.

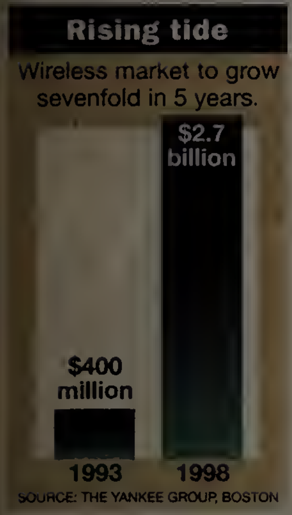
BY SKIP MACASKILL

MCI

Continued from page 13

Nancy Jenks, MCI's director of applications marketing.

Users will be able to dial in to the network at 4.8K or 9.6K bit/sec. Supported modem protocols will include the Enhanced Throughput Cellular and Microcom Networking Protocol 10 standards, protocols that can correct for transmission disruptions caused by users crossing cell boundaries.


Rising tide

Wireless market to grow sevenfold in 5 years.

SOURCE: THE YANKEE GROUP, BOSTON

MCI plans to charge 18.75 cents per minute for access via an 800 number, with term and volume discounts available. As the service roll out progresses, the carrier will introduce local access numbers, which will cut costs to 10 cents per minute. The service will be billed as an access option for MCI's X.25 service; local airtime charges also apply.

MCI is also considering adding Internet access, according to company executives.

FIRST IMPRESSIONS

The MCI announcement left Ira Brodsky, an analyst with Datacomm Research in Wilmette, Ill., unimpressed. The Nextel network would have given MCI an integrated national network for both voice and data; the current announcement just means the company is installing a few cellular modems in its X.25 network, he said.

"They've cobbled together a very easy-to-do offering," Brodsky said. "It's a great way to save face, but it's not really anything all that new." The only novel twist is MCI's conversion of analog cellular traffic to X.25 packets, allowing mobile users access to LANs and host computers, he said.

Dan Merriman, mobile and wireless communication service director at the BIS Strategic Decisions consultancy in Norwell, Mass., said the MCI plan does have its strengths.

Analog cellular is a relatively inexpensive way to send files of more than two to three pages of text, Merriman said. However, the emerging Cellular Digital Packet Data technology provides a shorter call set-up time and is better suited to bursty data, he said.

"I suspect they would evolve this to support other cellular technologies like CDPD very shortly," Merriman said. MCI is testing CDPD, but no decision has been make on its deployment.

For its part, MCI is still working on personal communications services, Jenks said. When it has an offering on the table, a large portion of the XstreamAir customers should be able to migrate to it, she said.

Comments?

See "Contacts" box on page 2.

NETWORK WORLD

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Second-class postage paid at Framingham, Mass., and additional mailing offices. Posted under Canadian International Publication agreement #0385662. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

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Non-qualified subscribers: $5.00 a copy; U.S. A $95 a year; Canada A $117.70 (including 7% GST, GST #126659952); Central & South America A $110 a year; Europe A $165 a year, all other countries A $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label from front cover of the publication.

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POSTMASTER: Send Change of Address to *Network World*, P.O. Box 3090, Northbrook, IL 60065.

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ISSN number: 0887-7661.

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